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TRANSACTIONS

OF THE

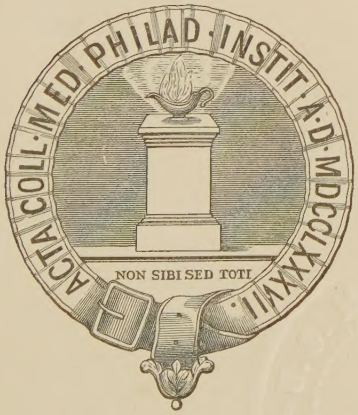
COLLEGE OF PHYSICIANS

OF

PHILADELPHIA.

THIRD SERIES.

VOLUME THE TWENTIETH.



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1898.

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The present volume of TRANSACTIONS contains the papers read before the College from January, 1898, to December, 1898, inclusive.

The Committee on Publication thinks it proper to say that the College holds itself in no way responsible for the statements, reasonings, or opinions set forth in the various papers published in its TRANSACTIONS.

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THOMPSON S. WESTCOTT.

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SMITHSONIAN INSTITUTION

COLLEGE OF PHYSICIANS OF PHILADELPHIA.

1898.

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OF THE

PRESIDENTS OF THE COLLEGE FROM THE TIME OF ITS INSTITUTION.

ELECTED

1787 JOHN REDMAN
1805 WILLIAM SHIPPEN
1809 ADAM KUHN
1818 THOMAS PARKE
1835 THOMAS C. JAMES
1835 THOMAS T. HEWSON
1848 GEORGE B. WOOD
1879 W. S. W. RUSCHENBERGER
1883 ALFRED STILLÉ
1884 SAMUEL LEWIS
1884 J. M. DA COSTA
1886 S. WEIR MITCHELL
1889 D. HAYES AGNEW
1892 S. WEIR MITCHELL
1895 J. M. DA COSTA
1898 JOHN ASHHURST, JR.

FELLOWS

OF THE

COLLEGE OF PHYSICIANS OF PHILADELPHIA.

DECEMBER, 1898.

* Non-resident Fellows.
† Fellows who have commuted dues.

ELECTED

*1883. Abbot, Griffith E., Ph.D., M.D., Washington, D. C.

1892. Abbott, Alex. C., M.D., Professor of Hygiene, and Director of Laboratory of Hygiene, University of Pennsylvania.

1876. Alison, Robert H., M.D.

1873. Allis, Oscar H., M.D., Clinical Lecturer on Orthopædic Surgery in Jefferson Medical College, and Surgeon to the Hospital of the same; Surgeon to the Presbyterian Hospital.

1896. Allyn, Herman B., M.D., Instructor in Physical Diagnosis in the University of Pennsylvania; Visiting Physician to St. Joseph's Hospital; Medical Registrar, Philadelphia Hospital.

1888. Anders, James M., M.D., Professor of Hygiene and Clinical Diseases of Children in the Medico-Chirurgical College, Philadelphia; Physician to the Philadelphia Hospital.

1869. Andrews, T. Hollingsworth, M.D., Consulting Surgeon to the Hospital of the Good Shepherd, Radnor; Medical Director of the Bureaus of Police and of Fire in the Department of Public Safety.

1896. Angney, William M., M.D., Physician to the House of Mercy (Home for Male Consumptives); Consulting Physician to the Hospital for Diseases of the Lungs, at Chestnut Hill.

ELECTED

*1882. Ashbridge, Richard, M.D., West Whiteland, Pa.

1863. Ashhurst, John, Jr., M.D., LL.D., Barton Professor of Surgery and Professor of Clinical Surgery in the University of Pennsylvania; Surgeon to the Pennsylvania Hospital and to the Children's Hospital; Consulting Surgeon to St. Christopher's Hospital, to the Woman's Hospital, and to the Hospital of the Good Shepherd, Radnor.

1865. Ashhurst, Samuel, M.D., Surgeon to the Children's Hospital.

1893. Ashton, Thomas G., M.D., Chief of Out-patient Medical Department, Jefferson Medical College Hospital; Demonstrator of Clinical Medicine, Jefferson Medical College; Visiting Physician to St. Mary's Hospital, Philadelphia.

1857. Atlee, Walter Franklin, A.M., M.D., Corresponding Member of La Société des Sciences Médicales de Lyons; Consulting Surgeon to St. Luke's Hospital, Bethlehem; Visiting Physician to the Preston Retreat.

1852. Bache, Thomas Hewson, M.D.

1883. Baer, Benjamin F., M.D., Professor of Gynecology in the Philadelphia Polyclinic.

†1892. Baker, George Fales, B.S., M.D.

1879. Baker, Washington H., M.D., Obstetrician to the Maternity Hospital.

1889. Baldy, John Montgomery, M.D., Professor of Gynecology in the Philadelphia Polyclinic; Surgeon to the Gynecean Hospital and to the Gynecological Out-patient Department of the Pennsylvania Hospital.

1898. Balliet, Tilghman M., M.D., Professor of Therapeutics at Dartmouth College, Hanover, N. H.; Physician to the Old Man's Home.

1880. Bartholow, Roberts, M.D., Professor (Emeritus) of Materia Medica, General Therapeutics and Hygiene in Jefferson Medical College.

1894. Barton, James M., M.D., Surgeon to the Jefferson Medical College Hospital and to the Philadelphia Hospital.

1883. Baum, Charles, A.M., M.D., Ph.D.

1873. Baxter, H. F., M.D.

1883. Beates, Henry, M.D.

1860. Benner, Henry D., M.D.

ELECTED

1874. Bennett, W. H., M.D., Physician-in-charge to the Children's Seashore House for Invalid Children, and to the Seaside House for Invalid Women, Atlantic City.

1896. Beyea, Henry D., M.D., Instructor in Gynecology and Assistant Demonstrator of Obstetrics in the University of Pennsylvania; Assistant Surgeon to the Gynecean Hospital.

†1884. Biddle, Alexander W., M.D.

1884. Biddle, Thomas, M.D.

*1866. Black, J. J., M.D., New Castle, Del.

1894. Bliss, Arthur Ames, M.D., Laryngologist to the German Hospital; Laryngologist and Aurist to the Pennsylvania Institution for the Deaf and Dumb.

*1867. Boardman, Charles H., M.D., Evanston, Illinois.

1894. Bochroch, Max H., Instructor in Electro-therapeutics and Chief Clinical Assistant in the Nervous Department, Jefferson Medical College Hospital.

1896. Boger, John A., M.D., Surgeon to St. Mary's Hospital; Surgeon to the Samaritan Hospital; Surgeon to the Dispensary of the Episcopal Hospital.

1891. Boyd, George M., M.D., Professor of Obstetrics in the Medico Chirurgical College; Physician to the Philadelphia Lying-in Charity and Nurse School.

†1884. Bradford, Thomas Hewson, M.D., Physician to the Dispensary of the Children's Hospital; Surgeon to the Gynecological Out-patient Department of the Pennsylvania Hospital.

1856. Brinton, John H., M.D., Professor of the Practice of Surgery and of Clinical Surgery in the Jefferson Medical College; Consulting Surgeon to the Southwestern Hospital of Philadelphia.

1891. Brinton, Lewis, M.D., Visiting Physician to the Nervous Department of the Howard Hospital.

1887. Brubaker, Albert P., M.D., Professor of Physiology and General Pathology in the Pennsylvania College of Dental Surgery; Demonstrator of Physiology in Jefferson Medical College; Lecturer on Anatomy and Physiology at the Drexel Institute.

*1890. Brush, Edward N., M.D., Medical Superintendent of the Shepherd Asylum, Towson, Md.

ELECTED

*1851. Bullock, William R., M.D., Wilmington, Del.

1887. Bunting, Ross R., M.D.

1870. Burnett, Charles H., M.D., Professor (Emeritus) of Otology in the Philadelphia Polyclinic; Clinical Professor of Otology in the Woman's Medical College; Aural Surgeon, Presbyterian Hospital; Consulting Aurist to the Pennsylvania Institution for the Deaf and Dumb, West Philadelphia Hospital for Women, and the Bryn Mawr Hospital.

1892. Burr, Charles W., M.D., Clinical Professor of Nervous Diseases, Medico-Chirurgical College; Professor of Mental and Nervous Diseases, Philadelphia Polyclinic.

1886. Cadwalader, Charles E., M.D.

1895. Carpenter, John T., Jr., M.D., Adjunct Professor of Diseases of the Eye, Philadelphia Polyclinic; Assistant Surgeon to Wills Hospital; Ophthalmologist to the New Jersey Training School, Vineland, N. J.

*1897. Carter, William S., M.D., Professor of Physiology in the University of Texas.

1892. Cattell, Henry W., M.D., Demonstrator of Morbid Anatomy in the University of Pennsylvania; Pathologist to the Presbyterian Hospital; Senior Physician to the Coroner of Philadelphia.

*1892. Cerna, David, M.D., Ph.D., Galveston, Texas; Demonstrator of Physiology in the Department of Medicine of the University of Texas; Corresponding Fellow of the Sociedad Española de Higiene of Madrid.

1885. Chapin, John B., M.D., Physician to the Pennsylvania Hospital for the Insane.

1880. Chapman, Henry C., M.D., Professor of the Institutes of Medicine and of Medical Jurisprudence in Jefferson Medical College.

1897. Chestnut, J. H. W., M.D., Visiting Physician to the Penn Widows' Asylum.

1868. Cheston, D. Murray, M.D.

1897. Cheston, Radcliffe, M.D.

1873. Clark, Leonardo S., M.D.

1897. Claxton, Charles, M.D.

1872. Cleemann, Richard A., M.D.

ELECTED

1896. Cleveland, Arthur H., M.D., Clinical Professor of Laryngology in the Medico-Chirurgical College; Surgeon-in-charge of Ear, Nose, and Throat Dispensary, Presbyterian Hospital.

*1842. Clymer, Meredith, M.D., New York.

1871. Cohen, J. Solis, M.D., Professor (Emeritus) of Diseases of the Throat and Chest in the Philadelphia Polyclinic; Professor (Honorary) of Laryngology in Jefferson Medical College; Consulting Physician to the Home for Consumptives.

1888. Cohen, Solomon Solis, M.D., Professor of Clinical Medicine and Therapeutics in the Philadelphia Polyclinic; Lecturer on Clinical Medicine in the Jefferson Medical College; Physician to the Philadelphia Hospital, to the Rush Hospital, and to the Polyclinic Hospital; Consulting Physician to the Jewish Hospital; Consulting Laryngologist to the Pennsylvania Training School for Feeble-minded Children.

1898. Coles, Stricker, M.D., Demonstrator of Obstetrics in the Jefferson Medical College; Assistant Obstetrician to the Jefferson Maternity; Assistant Physician to the Children's Department of the Howard Hospital.

1895. Cross, William A., M.D.

1866. Cruice, R. B., M.D., Surgeon to St. Joseph's Hospital.

1884. Curtin, Roland G., M.D., Lecturer on Physical Diagnosis in the University of Pennsylvania; Assistant Physician to the University Hospital; Physician to the Philadelphia and Presbyterian Hospitals.

1884. Da Costa, John C., M.D., Gynecologist to Jefferson Medical College Hospital and to St. Agnes's Hospital.

1896. Da Costa, John Chalmers, M.D., Surgeon to the Philadelphia Hospital; Demonstrator of Surgery in Jefferson Medical College; Chief Assistant Surgeon to the Hospital of Jefferson Medical College; Surgeon to Elwyn Institution for the Feeble-minded.

†1858. Da Costa, J. M., M.D., LL.D., Professor (Emeritus) of the Principles and Practice of Medicine in the Jefferson Medical College; Physician to the Pennsylvania Hospital; Consulting Physician to the Children's Hospital and to the Northern Dispensary.

ELECTED

1887. Daland, Judson, M.D., Instructor in Clinical Medicine and Lecturer on Physical Diagnosis in the University of Pennsylvania; Assistant Physician to the Hospital of the University of Pennsylvania; Professor of Clinical Medicine in the Philadelphia Polyclinic; Director of the Stetson Laboratory of Hygiene.

1859. Darrach, James, M.D., Consulting Surgeon to the Germantown Hospital.

1896. Davis, Charles N., M.D., Assistant Physician to the Dispensary for Diseases of the Skin, and Assistant Surgeon in the Dispensary for Genito-Urinary Diseases in the Hospital of the University of Pennsylvania; Physician to the Department for Skin Diseases, Northern Dispensary.

1888. Davis, Edward P., M.D., Professor of Obstetrics in the Jefferson Medical College; Professor of Obstetrics and Diseases of Infancy in the Philadelphia Polyclinic; Visiting Obstetrician to the Philadelphia Hospital; Physician to the Children's Department of the Howard Hospital.

1889. Davis, Gwilym G., M.D., M.R.C.S. Eng., Surgeon to the Episcopal and St. Joseph's Hospitals; Surgeon to the Orthopædic Hospital; Assistant Demonstrator of Surgery in the University of Pennsylvania.

1874. Deakyne, A. C., M.D.

1894. Deaver, Henry C., M.D., Surgeon to the Episcopal and St. Mary's Hospitals and to St. Christopher's Hospital for Children.

1887. Deaver, John B., M.D., Assistant Professor of Applied Anatomy in the University of Pennsylvania; Surgeon-in-Chief to the German Hospital; Surgeon to the Philadelphia Hospital; Consulting Surgeon to St. Agnes's, Germantown, and St. Timothy's Hospitals.

1892. Deaver, Richard Wilmot, M.D.

1885. Dercum, Francis X., M.D., Clinical Professor of Neurology in Jefferson Medical College; Neurologist to the Philadelphia Hospital.

1891. Dixon, Samuel G., M.D., President and Executive Curator of the Academy of Natural Sciences of Philadelphia; Director of the Philadelphia Zoölogical Society; Manager of the Ludwick Institution.

ELECTED

1891. Dixon, William C., M.D., Physician to the Industrial Home for Blind Women; Physician to the Shelter for Colored Orphans; Member of Consulting Staff, Philadelphia Home for Incurables; Examiner of Insane Patients, Philadelphia Hospital.

1896. Donnellan, P. S., M.D., L.R.C.P. and S., Ireland, Lecturer on Physical Diagnosis in the Medico-Chirurgical College of Philadelphia; Visiting Physician to St. Mary's Hospital; Clinical Assistant, Throat Department, Philadelphia Polyclinic; Medical Examiner, Mutual Life Insurance Company of New York.

1897. Dorland, W. A. Newman, M.D., Instructor in Gynecology, Philadelphia Polyclinic and College for Graduates in Medicine; Assistant Demonstrator of Obstetrics, University of Pennsylvania.

1893. Downs, Norton, M.D.

1864. Downs, R. N., M.D.

1884. Drysdale, T. M., M.D.

1864. Duer, Edward L., M.D., Accoucheur to the Philadelphia Hospital; Surgeon to the Maternity Hospital; Visiting Physician to the Preston Retreat.

1897. Duer, S. Naudain, M.D., Physician to the Dispensary of the Presbyterian Hospital; Chief of Clinic for Diseases of the Chest at the Philadelphia Polyclinic and College for Graduates in Medicine.

1871. Duhring, L. A., M.D., Professor of Skin Diseases in the University of Pennsylvania.

1881. Dulles, Charles Winslow, M.D., Lecturer on the History of Medicine, University of Pennsylvania; Surgeon to Rush Hospital; Surgeon in the Gynecological Dispensary, Presbyterian Hospital.

1863. Dunglison, Richard J., M.D.

*1871. Dunglison, Thomas R., M.D, Nogent sur Marne (Seine), France.

*1849. Dunott, Justus, M.D., Harrisburg, Pa.

1860. Dunton, William R., M.D., Consulting Physician to the Germantown Hospital.

*1887. Edwards, William A. M.D., San Diego, California.

ELECTED

1896. Ely, Thomas C., M.D.

1893. Eshner, Augustus A., M.D., Professor of Clinical Medicine in the Philadelphia Polyclinic; Physician to the Philadelphia Hospital.

*1880. Eskridge, J. T., M.D., Denver, Colorado.

1868. Evans, Horace Y., M.D., Physician to the Charity Hospital.

1894. Faries, Randolph, M.D., Surgeon to the Orthopædic Dispensary of the Hospital of the University of Pennsylvania; Director of Physical Education, Protestant Episcopal Academy, Philadelphia.

1893. Farr, William W., M.D., Assistant Physician in the Dispensary for Diseases of the Nose and Throat in the Hospital of the University of Pennsylvania.

1884. Fenton, Thomas H., M.D., Medical Director and Senior Ophthalmologist of the Union Mission Hospital; Ophthalmologist to St. Vincent's Home and to the Home for Aged Couples.

1866. Fischer, Emil, M.D.

1884. Fisher, Henry M., M.D., Physician to the Episcopal Hospital; Microscopist to the Pennsylvania Hospital and Physician to the Out-patient Department of the same.

1888. Flick, Lawrence F., M.D.

1862. Forbes, William S., M.D., Professor of Anatomy in Jefferson Medical College.

†1885. Fox, Joseph M., M.D., Leesburg, Va.

1897. Frazier, Charles H., M.D., Surgeon to the Howard Hospital; Assistant Surgeon to the Home for Crippled Children; Surgeon-in-Chief to the Surgical Dispensary, University of Pennsylvania; Surgeon to the Dispensary of the Episcopal Hospital; Assistant Instructor of Clinical Surgery, University of Pennsylvania.

†1890. Freeman, Walter J., M.D., Professor of Laryngology in the Philadelphia Polyclinic; Laryngologist to the Out-patient Department of the Children's Hospital; Consulting Laryngologist to the Pennsylvania Institution for the Deaf and Dumb.

1885. Fricke, Albert, M.D.

1893. Friebis, George, M.D., Ophthalmic Surgeon to the Mary Drexel Home and to the German Hospital.

ELECTED

1889. Fussell, M. Howard, M.D., Chief Physician to the Medical Dispensary of the Hospital of the University of Pennsylvania; Instructor in Clinical Medicine in the University of Pennsylvania.

1873. Gerhard, George S., M.D.

1864. Getchell, F. H., M.D.

1892. Gibb, Joseph S., M.D., Professor of Diseases of the Throat and Nose in the Philadelphia Polyclinic; Surgeon to the Ear, Nose, and Throat Department of the Episcopal Hospital.

1897. Girvin, John H., M.D., Instructor in Gynecology and Assistant Demonstrator of Obstetrics in the University of Pennsylvania; Surgeon to the Dispensary for Diseases of Women at the University Hospital and at the Presbyterian Hospital.

1885. Girvin, Robert N., M.D., Gynecologist to the Presbyterian Hospital.

1889. Githens, William H. H., M.D., Visiting Physician to the Sheltering Arms.

1894. Gleason, E. Baldwin, M.D., Clinical Professor of Otology in the Medico-Chirurgical College; Surgeon-in-Charge of the Nose, Throat, and Ear Department, Northern Dispensary.

*1893. Gobrecht, William H., M.D., Washington, D. C.

1884. Godey, Harry, M.D.

1893. Goodell, W. Constantine, M.D., Clinical Instructor in Gynecology in the University of Pennsylvania; Assistant Gynecologist, University Hospital.

†1897. Gould, George M., M.D.

1894. Graham, Edwin E., M.D., Clinical Professor of Diseases of Children in the Jefferson Medical College; Physician to the Franklin Reformatory Home.

1885. Graham, John, M.D.

1891. Green, Walter D., A.M., M.D., Out-patient Surgeon to the Pennsylvania and Children's Hospitals; Assistant Surgeon to the Gynecean Hospital.

1870. Grier, M. J., M.D.

1883. Griffith, J. P. Crozer, M.D., Clinical Professor of the Diseases of Children in the University of Pennsylvania; Professor of Clinical Medicine in the Philadelphia Polyclinic; Physician to St. Agnes's, the Children's, the Howard, the Methodist, and the Rush Hospitals.

ELECTED

1871. Grove, John H., M.D., Surgeon to St. Mary's and St. Agnes's Hospitals.

1889. Guitéras, John, M.D., Professor of General Pathology and Morbid Anatomy in the University of Pennsylvania.

*1893. Hamill, Robert H., M.D., Summit, N. J.

1894. Hamill, Samuel McC., M.D., Associate in Clinical Medicine in the William Pepper Laboratory of Clinical Medicine; Instructor in Clinical Medicine in the University of Pennsylvania; Physician to St. Christopher's Hospital for Children.

*1859. Hammond, William A., M.D., Surgeon-General U. S. A. (retired), Washington, D. C.

1897. Hand, Alfred, Jr., M.D., Physician to the Out-patient Department of the German, Methodist, and Children's Hospitals; Pathologist to the Children's Hospital; Assistant Demonstrator of Pathological Histology, University of Pennsylvania.

1886. Hansell, Howard F., M.D., Clinical Professor of Ophthalmology, Jefferson Medical College; Professor of Diseases of the Eye, Philadelphia Polyclinic; Consulting Ophthalmologist, Chester County Hospital; Ophthalmologist, Frederick Douglass Memorial Hospital.

1889. Hare, Hobart A., M.D., Professor of Therapeutics in Jefferson Medical College; Physician to St. Agnes's Hospital and to Jefferson Medical College Hospital.

1865. Harlan, George C., M.D., Surgeon to Wills Eye Hospital and to the Eye and Ear Department of the Pennsylvania Hospital; Professor (Emeritus) of Diseases of the Eye in the Philadelphia Polyclinic.

1862. Harris, Robert P., M.D.

1885. Harte, Richard H., M.D., Surgeon to Pennsylvania Hospital; Surgeon to Episcopal Hospital; Surgeon to St. Mary's Hospital; Consulting Surgeon to St. Timothy's Hospital; Demonstrator of Osteology, University of Pennsylvania.

1888. Hartzell, Milton B., M.D., Instructor in Dermatology, University of Pennsylvania; Dermatologist to the Methodist Episcopal Hospital.

1872. Hays, I. Minis, M.D.

ELECTED

1882. Hearn, W. Joseph, M.D., Surgeon to the Hospital of Jefferson Medical College and to the Philadelphia Hospital.

1884. Henry, Frederick P., M.D., Physician to the Philadelphia Hospital; Professor of the Principles and Practice of Medicine in the Woman's Medical College of Pennsylvania.

1891. Hewson, Addinell, A.M., M.D., Demonstrator of Anatomy in Jefferson Medical College; Dispensary Surgeon to the Hospital of the Protestant Episcopal Church.

1872. Hinkle, A. G. B., M.D.

1897. Hinkle, William M., M.D., Lecturer on the Anatomy and Physiology of the Vocal Organs in the National School of Elocution and Oratory.

1892. Hinsdale, Guy, M.D., Physician to the Presbyterian Orphanage and to the Out-patient Department of the Presbyterian Hospital; Assistant Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases.

1888. Hirsh, A. Bern., M.D., Physician to Charity Hospital.

1888. Hirst, Barton Cooke, M.D., Professor of Obstetrics in the University of Pennsylvania; Obstetrician to the Philadelphia Hospital and to the Maternity Hospital.

1894. Hoch, William R., M.D., Instructor in Laryngology, University of Pennsylvania; Laryngologist to Rush Hospital, and to the Methodist Episcopal Hospital.

1885. Holland, James W., M.D., Professor of Medical Chemistry and Toxicology in Jefferson Medical College.

†1879. Hopkins, William Barton, M.D., Surgeon to the Pennsylvania Hospital.

1888. Horwitz, Orville, M.D., Clinical Professor of Genito-Urinary Diseases in Jefferson Medical College; Surgeon to the Philadelphia Hospital.

1868. Howell, Samuel B., M.D., Professor of Chemistry in the Medico-Chirurgical College.

1892. Hughes, William E., M.D., Professor of Clinical Medicine in the Medico-Chirurgical College; Visiting Physician to the Philadelphia and Medico-Chirurgical Hospitals; Pathologist to the Presbyterian Hospital.

1898. Hutchinson, J. P., M.D., Assistant Demonstrator of Surgery in the University of Pennsylvania; Surgeon to the Dispensary of the Episcopal, Methodist, and Children's Hospitals.

ELECTED

1871. Ingham, James V., M.D.

1885. Jackson, Edward, M.D., Denver, Colorado, Emeritus Professor of Diseases of the Eye in the Philadelphia Polyclinic.

1887. Jayne, Horace, M.D., Professor of Vertebrate Morphology in the Biological Department of the University of Pennsylvania.

1898. Johnson, Russell H., M.D., Physician to the Pennsylvania Institution for the Deaf and Dumb.

1885. Judd, Leonardo Da Vinci, M.D.

1886. Jurist, Louis, M.D., Chief Clinical Assistant in the Laryngological Department of Jefferson Medical College Hospital.

†1867. Keen, William W., M.D., LL.D., Professor of the Principles of Surgery and of Clinical Surgery in the Jefferson Medical College; Surgeon to the Jefferson Medical College Hospital and to the Orthopædic Hospital and Infirmary for Nervous Diseases, and Consulting Surgeon to St. Agnes's Hospital and to the Woman's Hospital; Membre Correspondant Étranger de la Société de Chirurgie de Paris; Membre Honoraire de la Société Belge de Chirurgie.

1897. Kelly, Aloysius O. J., M.D., Clinical Professor of Pathology in the Woman's Medical College of Pennsylvania; Instructor in Physical Diagnosis, University of Pennsylvania; Visiting Physician to St. Mary's and St. Agnes's Hospitals; Pathologist to the German Hospital.

*1887. Kelly, Howard A., M.D., Professor of Gynecology in the Johns Hopkins University, and Gynecologist and Obstetrician to the Hospital, Baltimore, Md.

1898. Kempton, Augustus F., M.D.

1844. King, Charles R., M.D., Andalusia, Pa.

†1875. Kirkbride, Joseph J., M.D.

1895. Kneass, Samuel S., M.D., Associate in the William Pepper Laboratory of Clinical Medicine, University of Pennsylvania.

1897. Kyle, D. Braden, M.D., Clinical Professor of Laryngology and Rhinology, Jefferson Medical College; Consulting Laryngologist, Rhinologist, and Otologist to St. Agnes's Hospital; Bacteriologist to the Orthopedic Hospital and Infirmary for Nervous Diseases; Pathologist to the Charity Hospital; Visiting Physician to the Philadelphia Home for Incurables.

ELECTED

*1892. Lainé, Damaso T., M.D., Havana, Cuba.

1865. La Roche, C. Percy, M.D.

1887. Leaman, Henry, M.D.

1893. LeConte, Robert G., M.D., Surgeon to the Methodist Episcopal Hospital and to the Out-patient Departments of the Pennsylvania Hospital and Children's Hospital; Assistant Surgeon to the Orthopædic Hospital and Infirmary for Nervous Diseases, and to the Gynecean Hospital.

1883. Leffmann, Henry, M.D., Professor of Chemistry in the Philadelphia Polyclinic and in the Woman's Medical College; Pathological Chemist to Jefferson Medical College Hospital.

1892. Leidy, Joseph, M.D., Physician to the Out-patient Department of the Pennsylvania Hospital; Consulting Physician to the Pennsylvania Training School for Feeble-minded Children.

1855. Lewis, Francis W., M.D.

1877. Lewis, Morris, J., M.D., Physician to the Children's Hospital, to the Orthopædic Hospital and Infirmary for Nervous Diseases, and to the Pennsylvania Hospital.

1886. Lloyd, J. Hendrie, M.D., Physician to the Nervous and Insane Department of the Philadelphia Hospital, to the Methodist Episcopal Hospital, and to the Home for Crippled Children.

1893. Longaker, Daniel, M.D.

1877. Longstreth, Morris, M.D., Professor of Pathological Anatomy in Jefferson Medical College; Physician to the Pennsylvania Hospital.

1886. MacCoy, Alexander W., M.D., Professor of Diseases of the Throat and Nose in the Philadelphia Polyclinic; Lecturer on Diseases of the Throat and Nose in the Woman's Medical College of Pennsylvania.

1896. Makuen, G. Hudson, M.D., Professor of Defects of Speech in the Philadelphia Polyclinic; Laryngologist to St. Mary's Hospital and to the Frederick Douglass Memorial Hospital; Visiting Consultant on Defects of Speech at the New Jersey Training School for Feeble-minded Children.

*1885. Mallet, John W., M.D., Charlottesville, Va.

1898. Marshall, George Morley, M.D., Laryngologist to the Philadelphia Hospital; Physician and Laryngologist to St. Joseph's Hospital.

ELECTED

1893. Marshall, John, M.D., Professor of Chemistry in the University of Pennsylvania.

1889. Martin, Edward, M.D., Surgeon to the Howard Hospital; Clinical Professor of Genito-Urinary Diseases in the University of Pennsylvania.

1885. Mays, Thomas J., M.D., Professor of Diseases of the Chest and of Experimental Therapeutics in the Philadelphia Polyclinic; Visiting Physician to Rush Hospital.

1875. McClellan, George, M.D., Surgeon to the Howard Hospital.

1895. McFarland, Joseph, M.D., Professor of Pathology and Bacteriology in the Medico-Chirurgical College.

1868. Mears, J. Ewing, M.D., Professor of Anatomy and Clinical Surgery in the Pennsylvania College of Dental Surgery; Gynecologist to Jefferson Medical College Hospital; Surgeon to St. Agnes's Hospital.

1875. Meigs, Arthur V., M.D., Physician to the Pennsylvania Hospital; Consulting Physician to the Pennsylvania Institution for the Instruction of the Blind.

*1884. Mifflin, Houston, M.D., Columbia, Pa.

1894. Miller, D. J. Milton, M.D., Physician to the Episcopal Hospital; Assistant Physician to the Children's Hospital.

1881. Mills, Charles K., M.D., Professor of Mental Diseases and of Medical Jurisprudence in the University of Pennsylvania; Professor of Diseases of the Mind and Nervous System in the Philadelphia Polyclinic, and in the Woman's Medical College of Pennsylvania; Neurologist to the Philadelphia Hospital.

†1888. Mitchell, John K., M.D., Instructor in Clinical Medicine in the University of Pennsylvania; Physician to St. Agnes's Hospital; Assistant Physician to the University Hospital and to the Infirmary for Nervous Diseases.

1856. Mitchell, S. Weir, M.D., Professor of Diseases of the Mind and Nervous System in the Philadelphia Polyclinic; Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases; Consulting Physician to the Maternity Hospital.

1882. Montgomery, Edward E., M.D., Professor of Gynecology in Jefferson Medical College; Gynecologist to the Jefferson and St. Joseph's Hospital.

1863. Morehouse, George R., M.D., Ph.D.

ELECTED

1886. Morris, Caspar, M.D., Physician to the Episcopal Hospital and to the Out-patient Department of the Penna. Hospital.

1893. Morris, Elliston J., M.D., Physician to the Episcopal Hospital.

1883. Morris, Henry, M.D., Gynecologist to the Howard Hospital.

1856. Morris, J. Cheston, M.D.

1897. Morton, Samuel W., M.D., Instructor in Clinical Medicine, University of Pennsylvania; Medical Director of the Pennsylvania Epileptic Hospital and Colony Farm; Visiting Physician to the Philadelphia Home for Incurables, to the Masonic Home of Pennsylvania, and to the Hospital of the Pennsylvania Epileptic Hospital and Colony Farm.

1861. Morton, Thomas G., M.D., Surgeon to the Pennsylvania and the Orthopædic Hospitals; Consulting Surgeon to the Jewish Hospital; Emeritus Surgeon to Wills Eye Hospital.

1891. Morton, T. S. K., M.D., Professor of Surgery in the Philadelphia Polyclinic; Surgeon to the Polyclinic Hospital; Assistant Surgeon to the Orthopædic Hospital; Surgeon to Out-patient Department of the Pennsylvania Hospital; Consulting Surgeon to the Philadelphia Dispensary.

1864. Moss, William, M.D.

1898. Muehleck, George A., M.D., Pathologist to St. Agnes's Hospital, and Chief of Medical Dispensary of the same.

1890. Müller, Auguste F., M.D., Attending Physician to the Germantown Hospital.

1882. Musser, John H., M.D., Assistant Professor of Clinical Medicine in the University of Pennsylvania; Physician to the Philadelphia Hospital and to the Presbyterian Hospital; Consulting Physician to the Woman's Hospital of Philadelphia and to the West Philadelphia Hospital for Women.

1896. Myers, T. D., M.D.

1886. Neff, Joseph S., M.D.

1887. Neilson, Thomas Rundle, M.D., Surgeon to the Episcopal Hospital and to St. Christopher's Hospital for Children; Professor of Genito-Urinary Surgery in the Philadelphia Polyclinic; Assistant Demonstrator of Surgery in the University of Pennsylvania.

ELECTED

1889. Noble, Charles P., M.D., Surgeon-in-Chief to the Kensington Hospital for Women; Surgeon-in-Charge of the Department for Women of the Northern Dispensary; Surgeon-in-Charge of the Department for Women of the Union Dispensary; Lecturer on Gynecology in the Philadelphia Polyclinic.

1893. Noble, William H., M.D.

1898. Nolan, Edward J., M.D., Recording Secretary and Librarian of the Academy of Natural Sciences of Philadelphia.

1869. Norris, Herbert, M.D., Supervising Physician to St. Clement's Hospital.

1865. Norris, Isaac, Jr., M.D.

1892. Norris, Richard C., M.D., Lecturer on Clinical and Operative Obstetrics, University of Pennsylvania; Obstetrician-in Charge, Preston Retreat; Visiting Obstetrician to the Philadelphia Hospital; Gynecologist to the Methodist Hospital; Consulting Obstetrician and Attending Gynecologist to the Southeastern Dispensary and Hospital.

1866. Norris, William F., M.D., Professor of Ophthalmology and Clinical Professor of Diseases of the Eye in the University of Pennsylvania; Surgeon to Wills Eye Hospital.

1884. Oliver, Charles A., M.D., Attending Surgeon to Wills Eye Hospital; Ophthalmic Surgeon to the Philadelphia and the Presbyterian Hospitals; Consulting Ophthalmic Surgeon to St. Agnes's, St. Timothy's, and Maternity Hospitals; Consulting Ophthalmologist to the State Hospital for the Chronic Insane of Pennsylvania.

1884. O'Neill, J. W., M.D.

*1885. Osler, William, M.D., Professor of Medicine in Johns Hopkins University, and Physician to the Hospital, Baltimore, Md.

1897. Packard, Francis R., M.D., Assistant in the Clinic for Diseases of the Ear at the Polyclinic Hospital; Assistant Physician in the Dispensary for Diseases of the Nose and Throat in the Hospital of the University of Pennsylvania; Laryngologist and Otologist to the Pennsylvania Institution for the Deaf and Dumb.

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1890. Packard, Frederick A., M.D., Visiting Physician to the Philadelphia and Children's Hospitals; Physician to the Out patient Department of the Pennsylvania Hospital; Instructor in Physical Diagnosis in the University of Penna.

1858. Packard, John H., M.D., Late Surgeon to the Pennsylvania Hospital; Surgeon to St. Joseph's Hospital.

1898. Page, Henry F., M.D., Assistant Physician to the German Hospital, and Physician to the Medical Dispensary of the same; Instructor in Clinical Medicine in the Woman's Medical College of Pennsylvania; Physician to the Baptist Home.

1882. Parish, William H., M.D., Professor of Obstetrics in the Dartmouth Medical College; Professor of Anatomy in the Woman's Medical College of Pennsylvania; Consulting Obstetrician to the Lying-in Charity; Consulting Surgeon to the Kensington Hospital; Consulting Gynecologist to St. Agnes's Hospital.

1896. Pearce, F. Savary, M.D., Instructor in Physical Diagnosis in the University of Pennsylvania; Chief of the Medical Dispensary of St. Agnes's Hospital.

†1889. Penrose, Charles Bingham, M.D., Professor of Gynecology in the University of Pennsylvania; Surgeon to the Gynecean Hospital.

1854. Penrose, R. A. F., M.D., LL.D., Professor (Emeritus) of Obstetrics and Diseases of Women and Children in the University of Pennsylvania; Consulting Obstetrician to the Maternity Hospital; Visiting Physician to the Preston Retreat.

1884. Perkins, Francis M., M.D., Ophthalmic Surgeon to St. Agnes's Hospital; Ophthalmic Surgeon to the Presbyterian Hospital.

1890. Phillips, J. Willoughby, M.D.

1883. Piersol, George A., M.D., Professor of Anatomy in the University of Pennsylvania.

1872. Porter, William G., M.D., Surgeon to the Presbyterian Hospital and to the Philadelphia Hospital.

1896. Posey, W. Campbell, M.D., Assistant Surgeon to Wills Eye Hospital; Ophthalmologist to the Howard and Epileptic Hospitals, and to the Home for Incurables; Consulting Ophthalmologist to the State Hospital for the Insane at Norristown.

ELECTED

1885. Potter, Thomas C., M.D.

†1889. Price, Joseph, M.D., Obstetric Physician to the Philadelphia Dispensary.

1887. Randall, B. Alexander, M.D., Clinical Professor of Diseases of the Ear in the University of Pennsylvania; Professor of Diseases of the Ear in the Philadelphia Polyclinic; Ophthalmic and Aural Surgeon to the Children's Hospital; Otologist to Rush Hospital.

1887. Reed, Charles H., M.D.

1885. Reichert, Edward T., M.D., Professor of Physiology in the University of Pennsylvania.

1897. Rhein, John H. W., M.D., Medical Electrician to the Orthopædic Hospital and Infirmary for Nervous Diseases; Bacteriologist to the Pennsylvania Training School for Feeble-minded Children; Instructor in Neuro-pathology, Philadelphia Polyclinic and College for Graduates in Medicine; Chief of Clinic for Nervous Diseases, St. Agnes's Hospital.

1891. Rhoads, Edward G., M.D.

1898. Riesman, David, M.D., Adjunct Professor of Clinical Medicine in the Philadelphia Polyclinic; Demonstrator of Pathological Histology and Morbid Anatomy in the University of Pennsylvania; Neurologist to the Northern Dispensary; Visiting Physician to the Northern Day Nursery.

1895. Ring, Gassaway Oram, M.D., Ophthalmic Surgeon to the Episcopal Hospital, and Ophthalmic and Aural Surgeon to the Samaritan Hospital, Philadelphia.

1891. Risley, S. D., M.D., Lecturer on Ophthalmology in the University of Pennsylvania; Attending Surgeon to the Wills Eye Hospital; Professor of Ophthalmology in the Philadelphia Polyclinic and College for Graduates in Medicine.

†1878. Roberts, John B., M.D., Professor of Anatomy and Surgery in the Philadelphia Polyclinic; Professor of Surgery in the Woman's Medical College of Pennsylvania; Surgeon to the Methodist Hospital.

1888. Robins, Robert P., M.D., Visiting Surgeon to the Dispensary of the House of Industry, to the Church Home for Children, and to the Board of Guardians of the Poor; Lecturer on Chemistry in the Episcopal Academy.

ELECTED

1898. Ross, George G., M.D., Assistant Surgeon to the German Hospital; Surgeon to the Out-patient Department of the same.

1897. Sailer, Joseph, M.D., Associate in the Pepper Clinical Laboratory, University of Pennsylvania; Pathologist to the Institution for Feeble-minded Children.

†1866. Schaffer, Charles, M.D., Professor of Botany in the Pennsylvania Horticultural Society.

1887. De Schweinitz, George E., M.D., Clinical Professor of Ophthalmology in the Jefferson Medical College; Professor of Ophthalmology in the Philadelphia Polyclinic; Ophthalmic and Aural Surgeon to the Children's Hospital; Ophthalmologist to the Orthopædic Hospital and to the Philadelphia Hospital; Consulting Ophthalmic Surgeon to the Methodist Episcopal Hospital.

1885. Scott, J. Alison, M.D., Demonstrator of Physical Diagnosis in the University of Pennsylvania; Physician to Out-patient Department, Pennsylvania Hospital; Physician to the Church Home; Assistant Medical Director of Penn Mutual Life Insurance Company.

1892. Seiss, Ralph W., M.D., Professor of Otology in the Philadelphia Polyclinic.

1888. Seltzer, Charles M., M.D.

1875. Seyfert, Theodore H., M.D.

1884. Shaffner, Charles, M.D., Ophthalmic Surgeon to the Presbyterian Hospital.

1887. Shakespeare, Edward O., M.D.

1897. Sharpless, W. T., M.D., Physician to the Chester County Hospital, West Chester, Pa.

1876. Shippen, Edward, A.M., M.D., U. S. Navy (retired).

1891. Shober, John B., M.D., Gynecologist to the Philadelphia Hospital and to the Howard Hospital; Assistant Gynecologist to the Gynecean Hospital.

1890. Shoemaker, George Erety, A.M., M.D., Gynecologist to the Methodist Hospital.

†1893. Shoemaker, Harvey, M.D., Visiting Physician to the Sheltering Arms, and to the Southern Home for Destitute Children; Assistant Physician to the German Hospital; Physician

ELECTED

to the Out-patient Department of the German and Children's Hospitals.

†1896. Shoemaker, William T., M.D., Assistant Ophthalmologist to the German Hospital; Ophthalmic Surgeon to the Out-patient Department of the same; Ophthalmic Surgeon to the Presbyterian Hospital; Ophthalmologist to the Southern Home for Destitute Children.

1880. Simes, J. H. C., M.D., Emeritus Professor of Genito-Urinary and Venereal Diseases in the Philadelphia Polyclinic.

1872. Sinkler, Wharton, M.D., Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases; Neurologist to the Philadelphia Hospital; Physician to the Epileptic Hospital of Philadelphia.

1895. Slocum, Harris A., M.D., Gynecologist to St. Clement's Hospital for Epileptics; Professor of Gynecology in the Philadelphia Polyclinic.

*1863. Smith, A. K., M.D., U.S.A. (retired), New Hartford, Conn.

*1864. Smith, Edward A., M.D., New York.

1895. Spellissy, Joseph M., M.D., Visiting Surgeon to St. Mary's Hospital; Out-patient Surgeon to the Pennsylvania, Methodist, and St. Agnes's Hospitals, and Assistant Surgeon to the Orthopædic Dispensary of the University Hospital.

1897. Spiller, William G., M.D., Professor of Diseases of the Nervous System in the Philadelphia Polyclinic and College for Graduates in Medicine; Associate in the William Pepper Clinical Laboratory, University of Pennsylvania; Neurologist to the New Jersey Training School for Feeble-minded Children; Pathologist to the Pennsylvania Training School for Feeble-minded Children; Pathologist to the Pennsylvania Epileptic Hospital and Colony Farm.

1894. Stahl, B. Franklin, Ph.G., B.S., M.D., Instructor in Physical Diagnosis, and Lecturer on Dietetics for the Sick in the University of Pennsylvania; Visiting Physician to St. Agnes's Hospital; Ophthalmic Surgeon to Charity Hospital.

1875. Starr, Louis, M.D.

1898. Steele, J. Dutton, M.D., Assistant Demonstrator of Morbid Anatomy, and Students' Physician in the University of Pennsylvania; Pathologist to the West Philadelphia Hospital for Women; Bacteriologist to the Presbyterian Hospital.

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1892. Steinbach, Lewis W., M.D., Professor of Clinical and Operative Surgery in the Philadelphia Polyclinic; Visiting Surgeon to the Philadelphia Hospital and to the Jewish Hospital of Philadelphia.

1884. Stelwagon, Henry W., M.D., Ph.D., Clinical Professor of Dermatology in Jefferson Medical College; Dermatologist to the Philadelphia Hospital; Physician to the Department for Skin Diseases of the Howard Hospital and the Northern Dispensary; Clinical Professor of Dermatology in the Woman's Medical College; Consulting Dermatologist to the Pennsylvania Institution for the Deaf and Dumb; Socio Corrispondente di La Societa Italiano di Dermatologia e Sifilografia.

1895. Stengel, Alfred, M.D., Instructor in Clinical Medicine, University of Pennsylvania; Assistant Physician, University Hospital; Professor of Clinical Medicine, Woman's Medical College; Physician to Howard, Philadelphia, and Children's Hospitals; Pathologist to German Hospital.

1888. Stewart, David D., M.D., Professor of Diseases of the Stomach and Intestines in the Philadelphia Polyclinic; Attending Physician to the Episcopal Hospital.

1898. Stiles, George M., M.D.

†1842. Stillé, Alfred, M.D., LL.D., Professor (Emeritus) of the Theory and Practice of Medicine in the University of Pennsylvania; Consulting Physician to the Maternity Hospital, to the Woman's Hospital, and to Rush Hospital.

1898. Stout, George C., M.D., Laryngologist and Aurist to the Children's Aid Society; Instructor in Otology in the Philadelphia Polyclinic; Assistant Demonstrator of Histology in the University of Pennsylvania.

1884. Stryker, Samuel S., M.D., Physician to the Presbyterian Hospital.

1898. Sweet, William M., M.D., Associate in Ophthalmology in the Philadelphia Polyclinic; Instructor in Ophthalmology, and Chief Clinical Assistant in the Out-patient Eye Department, Jefferson Medical College; Ophthalmic Surgeon to the Phœnixville Hospital.

1886. Taylor, John Madison, M.D., Neurologist to Howard Hospital; Assistant Physician to the Orthopædic Hospital and

ELECTED

Infirmary for Nervous Diseases; Assistant Physician to the Children's Hospital; Professor of Children's Diseases in the Philadelphia Polyclinic.

1887. Taylor, William J., M.D., Surgeon to St. Agnes's Hospital, and Assistant Surgeon to the Orthopædic Hospital and Infirmary for Nervous Diseases.

1886. Taylor, William L., M.D., Instructor in Clinical Gynecology in the University of Pennsylvania, and Chief of the Clinic and Assistant Gynecologist to the Hospital of the same; Surgeon-in-Chief to the Beacon Service for Women.

1867. Thomas, Charles Hermon, M.D.

1897. Thomson, A. G., M.D., Ophthalmic Surgeon to the Children's Hospital; Assistant Ophthalmic Surgeon to Wills Eye Hospital; Assistant Ophthalmologist to the Orthopædic Hospital and Infirmary for Nervous Diseases; Ophthalmologist to Bethany Dispensary; Demonstrator of Ophthalmology in the Philadelphia Polyclinic and College for Graduates in Medicine.

†1869. Thomson, William, M.D., Emeritus Professor of Ophthalmology in the Jefferson Medical College, and Ophthalmic Surgeon to the Hospital of the same; Emeritus Surgeon to Wills Eye Hospital.

1896. Thorington, James, M.D., Adjunct Professor of Diseases of the Eye in the Philadelphia Polyclinic; Assistant Surgeon to Wills Eye Hospital; Ophthalmologist to the Methodist Orphanage; Ophthalmologist to the Elwyn Training School for Feeble-minded Children; Ophthalmologist to the Vineland Training School for Feeble-minded Children.

1898. Thornton, Edward Q., M.D., Demonstrator of Therapeutics in the Jefferson Medical College.

*1896. Toulmin, Henry, M.D., Milwaukee, Wis.

†1894. Tunis, Joseph Price, M.D., Assistant Demonstrator of Anatomy and of Surgery in the University of Pennsylvania; Surgeon to the Methodist Hospital; Surgeon to the Dispensaries of the Presbyterian and Children's Hospitals.

1866. Tyson, James, M.D., Professor of Clinical Medicine in the University of Pennsylvania; Physician to the Hospital of the University of Pennsylvania; Physician to the Philadelphia Hospital.

ELECTED

1897. Tyson, T. Mellor, M.D., Assistant Physician to the Hospital of the University of Pennsylvania; Instructor in Clinical Medicine in the University of Pennsylvania; Assistant Physician in the Medical Dispensary in the University Hospital; Visiting Physician to the Rush Hospital for the Treatment of Consumption; one of the Physicians to the Philadelphia Lying-in Hospital.

1864. Vandyke, E. B., M.D.

1873. Van Harlingen, Arthur, M.D., Emeritus Professor of Diseases of the Skin in the Philadelphia Polyclinic; Dermatologist to the Howard Hospital.

1893. Vansant, Eugene Larue, M.D., Lecturer on Clinical Medicine in Jefferson Medical College; Visiting Physician to the Philadelphia Hospital.

1897. Veasey, Clarence A., M.D., Adjunct Professor of Diseases of the Eye, Philadelphia Polyclinic and College for Graduates in Medicine; Demonstrator of Ophthalmology, Jefferson Medical College; Chief Clinical Assistant to the Ophthalmological Department, Jefferson Medical College Hospital; Consulting Ophthalmologist, Philadelphia Lying-in Charity.

†1883. Vinton, Charles Harrod, M.D.

1885. Walker, James B., M.D., Attending Physician to the Philadelphia Hospital; Lecturer on Clinical Medicine and Consulting Physician to the Woman's Hospital.

1893. Warren, Joseph W., M.D., Associate Professor of Physiology in Bryn Mawr College.

1895. Watson, Arthur W., M.D.

1886. Watson, E. W., M.D., Physician to the Pennsylvania Institution for the Blind; Visiting Physician to the Home for Consumptives.

1875. Webb, William H., M.D.

1883. Welch, William M., M.D., Physician-in-Charge of the Municipal Hospital for Contagious Diseases; Consulting Physician to the Northern Dispensary; Consulting Physician to the Northern Home for Friendless Children.

1897. Wells, William H., M.D., Adjunct Professor of Obstetrics and Diseases of Infancy in the Philadelphia Polyclinic; Instructor of Obstetrics in the Jefferson Medical College.

ELECTED

1893. Westcott, Thompson S., M.D., Instructor in Diseases of Children in the University of Pennsylvania; Visiting Physician to the Methodist Episcopal Hospital; Assistant Physician to the Children's Hospital.

1884. Wharton, Henry R., M.D., Demonstrator of Surgery in the University of Pennsylvania, and Assistant Surgeon to the Hospital of the University of Pennsylvania; Surgeon to the Children's and Presbyterian Hospitals.

1883. Whelen, Alfred, M.D.

1878. White, J. William, M.D., Professor of Clinical Surgery in the University of Pennsylvania; Surgeon to the Maternity Hospital.

1898. Whiting, Albert D., M.D., Assistant Surgeon to the German Hospital; Physician to the Southern Home for Destitute Children; Registrar to St. Mary's Hospital.

†1880. Willard, De Forest, M.D., Clinical Professor of Orthopædic Surgery in the University of Pennsylvania; Surgeon to the Presbyterian Hospital; Consulting Surgeon to the White and to the Colored Cripples' Home and to the Home for Incurables.

*1878. Williamson, Jesse, M.D., Wilmington, Delaware.

1881. Wilson, H. Augustus, M.D., Professor of General and Orthopædic Surgery in the Philadelphia Polyclinic; Clinical Professor of Orthopædic Surgery in the Jefferson Medical College; Consulting Orthopædic Surgeon to the Philadelphia Lying in Charity and to the Kensington Hospital for Women.

1874. Wilson, James C., M.D., Professor of the Practice of Medicine and of Clinical Medicine in the Jefferson Medical College, and Physician to the Hospital of the same (Faculty Staff); Physician-in Chief to the German Hospital; Attending Physician to the Pennsylvania Hospital.

1897. Wilson, W. Reynolds, M.D., Visiting Physician to the Philadelphia Lying-in Charity Hospital.

†1884. Wirgman, Charles, M.D., Physician to the Hospital of Jefferson Medical College and to the Howard Hospital; Physician to the Out-patient Department of Children's Hospital.

1893. Wolff, Lawrence, M.D., Demonstrator of Chemistry in the Jefferson Medical College; Visiting Physician to the Ger-

ELECTED

man Hospital; Clinical Professor of Medicine in the Woman's Medical College.

1893. Wood, Alfred C., M.D., Instructor in Clinical Surgery in the University of Pennsylvania; Assistant Surgeon to the University Hospital; Surgeon to the Philadelphia Hospital.

1865. Wood, Horatio C., M.D., Professor of Materia Medica, Pharmacy, and General Therapeutics in the University of Pennsylvania, and Clinical Professor of Diseases of the Nervous System in the Hospital of the same.

1880. Woodbury, Frank, M.D., Honorary Professor of Clinical Medicine in the Medico-Chirurgical College, and Physician to the Hospital of the same.

1866. Woods, D. F., M.D., Physician to the Presbyterian Hospital.

1888. Woodward, Charles E., M.D., Physician to the Chester County Prison and West Chester Board of Health; U. S. Examining Surgeon.

†1897. Woodward, George, M.D., Associate in Clinical Medicine, University of Pennsylvania.

1860. Wurts, Charles Stewart, M.D., Physician to Foster Home.

1868. Yarrow, Thomas J., M.D.

1889. Young, James K., M.D., Instructor in Orthoæpdic Surgery, University of Pennsylvania; Assistant Orthopædic Surgeon to the University Hospital; Professor of Orthopædic Surgery, Philadelphia Polyclinic; Clinical Professor of Orthopædic Surgery in the Woman's Medical College of Pennsylvania; Surgeon to the Home for Crippled Children.

1894. Zentmayer, William, M.D., Assistant Surgeon to Wills Eye Hospital; Ophthalmologist to St. Mary's Hospital.

1887. Ziegler, Walter M. L., M.D., Assistant Aural Surgeon and Chief of the Dispensary for Diseases of the Ear in the Hospital of the University of Pennsylvania.

1895. Zimmerman, Mason W., M.D., Ophthalmic Surgeon to the Germantown Hospital.

ASSOCIATE FELLOWS.

[Limited to Fifty, of whom Twenty may be Foreigners.]

American.

ELECTED

1876. Billings, John S., M.D., U. S. A., New York.
1886. Bowditch, Henry P., M.D., Boston, Massachusetts.
1877. Chaillé, Stanford E., M.D., New Orleans, Louisiana.
1886. Cheever, David W., M.D., Boston, Massachusetts.
1896. Conner, Phineas Sanborn, M.D., Cincinnati, Ohio.
1893. Councilman, William T., M.D., Boston, Massachusetts.
1876. Davis, N. S., M.D., Chicago, Illinois.
1886. Draper, William H., M.D., New York.
1892. Emmet, Thomas Addis, M.D., New York.
1892. Fitz, Reginald H., M.D., Boston, Massachusetts.
1895. Fletcher, Robert, M.D., Washington, D. C.
1891. Jacobi, A., M.D., New York.
1893. Kerr, John G., M.D., Canton, China.
1895. McBurney, Charles, M.D., New York.
1886. McGuire, Hunter, M.D., Richmond, Virginia.
1876. Moore, E. M., M.D., Rochester, New York.
1876. Pollock, A. M., M.D., Pittsburg, Pennsylvania.
1886. Reeve, John C., M.D., Dayton, Ohio.
1886. Senn, Nicholas, M.D., Chicago, Illinois.
1896. Sternberg, George M., M.D., U. S. A., Washington, D. C.
1886. Thomas, T. Gaillard, M.D., New York.
1896. Tiffany, L. McLane, M.D., Baltimore, Maryland.
1894. Warren, J. Collins, M.D., Boston, Massachusetts.
1894. Weir, Robert F., M.D., New York.
1892. Welch, William H., M.D., Baltimore, Maryland.
1886. Whittaker, James T., M.D., Cincinnati, Ohio.

Foreign.

ELECTED

1873. Acland, Henry W., M.D., F.R.S., Oxford, England.
1890. Baccelli, Guido, Rome, Italy.
1877. Barnes, Robert, M.D., London, England.
1894. Brunton, T. Lauder, M.D., London, England.
1883. Fayrer, Sir Joseph, M.D., LL.D., F.R.S., London, England.
1883. Heath, Christopher, F.R.C.S., London, England.
1896. Jaccoud, Prof. S., M.D., Paris, France.
1874. Jackson, J. Hughlings, M.D., London, England.
1893. v. Jaksch, Rudolf, M.D., Prague, Bohemia.
1876. Johnson, Sir George, M.D., F.R.S., London, England.
1896. Leyden, Ernst, M.D., Berlin, Germany.
1877. Lister, Sir Joseph, Bart., M.D., LL.D., F.R.S., London, England.
1873. Ogle, John W., M.D., London, England.
1874. Paget, Sir James, Bart., M.D., LL.D., F.R.S., D.C.L., London, England.
1898. Roddick, Thomas G., M.D., Montreal, Canada.
1896. Pye-Smith, P. H., M.D., London, England.
1896. Stewart, Sir T. Grainger, Bart., M.D., Edinburgh, Scotland.
1869. Valcourt, Th. de, M.D., Cannes, France.
1892. Virchow, Rudolf, M.D., Berlin, Germany.

CORRESPONDING MEMBERS.

ELECTED

1880. Carrow, Flemming, M.D., United States.
1880. Chiara, Domenico, M.D., Florence, Italy.
1886. Dey, Kanny Lall, M.D., Calcutta, India.
1885. Rendu, Jean, M.D., Lyons, France.

NECROLOGICAL LIST

FELLOWS

JOSEPH F. EDWARDS,	December 6, 1897
THEOPHILUS PARVIN,	January 29, 1898
ISAAC MASSEY,	January 31, 1898
OLIVER A. JUDSON,	March 30, 1898
THOMAS D. DUNN,	May 6, 1898
WILLIAM PEPPER,	July 28, 1898
LAWRENCE S. SMITH,	August 15, 1898
JOHN LINDSAY,	December 23, 1898

ASSOCIATE FELLOW

DAVID W. YANDELL,	May 3, 1898

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MEMOIR OF HARRISON ALLEN, M.D.

By HORATIO C. WOOD, M.D.

[Read April 6, 1898.]

In the year 1682, in which William Penn landed upon the shores of the Delaware, there arrived from Bristol, England, a member of the Society of Friends or Quakers, one Samuel Allen, who finally settled in what is now Bristol, Pennsylvania, and became an historical character by giving the same year his daughter Priscilla in marriage to Thomas Smith, and thus bringing about the first marriage ever celebrated in Philadelphia. His son, Samuel Allen, the second, married Jane Waln, daughter of the locally famous Nicholas Waln. Of the progeny of this marriage, one son, William Allen, was Mayor of the City of Philadelphia in 1736; another son, Samuel Allen, third, had a son Samuel Allen, fourth, whose son David Allen married and settled in Philadelphia about 1810, and became the father of Samuel Allen, fifth, who in the fulness of time married Elizabeth Justice Thomas, subsequently the mother of the subject of the present memoir.

Dr. Harrison Allen was born in Philadelphia, April 17, 1841, and after passing through the public grammar schools entered the Philadelphia High School, but was compelled a year later, by the financial failure of his father, to take a business position. His duties, however, were extremely irksome to him, and as the only apparent escape, in April, 1858, he became a student in the office of Dr. J. Foster Flagg, where for about one year he studied dentistry with his habitual earnestness and fidelity.

Matriculating in the Medical Department of the University of Pennsylvania in 1859, and graduating in March, 1861, Dr. Allen passed immediately into the Philadelphia Hospital as Resident Physician, where he remained until January 31, 1862, when he entered the service of the United States as Acting Assistant Surgeon, and performed duty in the Broad Street General Hospital of Philadelphia and the Cliffburne General Hospital of Washington until July 30, at which time he received a commission as Assistant Surgeon in the regular army of the United States, and was transferred to the Artillery of the 3d Corps, then attached to the Army of the Potomac. In February, 1863, he was assigned to the Douglas Hospital; from that date until his resignation from the United States Army, December 1, 1865, Dr. Allen was continually engaged in the various hospitals about Washington. At the time General Grant was going through the Wilderness he was in charge of the Fairfax Seminary Hospital, of Alexandria, Virginia, immediately in the rear of the fighting line, at which place the writer of the present memoir had the honor of serving under him as a subordinate, and of becoming acquainted with his methods and habits, renewing or rather refreshing an old friendship which had commenced in the Museums of the Academy of Natural Sciences, then situated at Broad and Sansom Streets in Philadelphia.

Probably the younger Fellows of the College have never been impressed by the fact that the quiet, retiring gentleman who went in and out among them was possessed of marked executive ability. Nevertheless, when at the age of twenty-four, he was, by the exigencies of the Civil War, thrown into very difficult positions of command, his ability asserted itself most successfully. During my service under him at the Alexandria Hospital, time after time there would come from headquarters at the front the abrupt order to clear the wards at once and prepare the eight hundred beds for newly-wounded men, so that in verity an almost continuous stream of the débris of war passed through the hospital, making a strain upon its management which would appear to demand direction

by an officer of long training and much experience; and yet this stripling, absolutely without previous preparation for executive work, was able to organize, to maintain discipline, and to command the respect and obedience of every subordinate. Holding himself aloof even from his medical staff, Dr. Allen, with a persistent self-dignity, an ever-ready courtesy, a perpetual watchful care founded upon a close knowledge of every detail, kept the great machine working so smoothly that to the beholder there was neither sign nor sound of stir or effort.

December 1, 1865, Dr. Allen resigned from the United States Army with the rank of brevet-major, and immediately began the practice of his profession in the city of Philadelphia, and so continued up to the day of his death. It was here, December 29, 1869, that he married Miss Julia Colton; and it was here that most of his scientific and professional life-work was done; though in the later years of his life he established a second home at Siasconset, on Nantucket Island, where during the summer months he obtained diversion in the investigation of the lower forms of animal life.

From the time of his return to Philadelphia until his death the intellectual life of Dr. Allen may be said to have been twofold; on the one hand, it was concerned with practical medicine or surgery; on the other hand, it was devoted to the study of certain abstract sciences which are either the basis of the art of medicine or are closely related therewith; and in each field of activity he seemed to be almost equally successful—as a practitioner, as an investigator, as a teacher, he was in the front rank.

His natural history studies began under the influence of Professor Henry McMurtrie in the High School of Philadelphia, and during his whole student life, in the office of Dr. Flagg and in the lecture-halls of the University of Pennsylvania, much of his time was given to the study of animate nature in its scientific aspect. His graduation thesis, in 1861, was upon "Human Entozoa," and in July of the same year his first contribution to science appeared as the description of four new species of bats which had been collected by Du

Chaillu in Africa. Amidst the distracting duties of his army life he was able to find time for work in the museums of the Smithsonian Institute, and in 1864 he produced a monograph on the bats of North America, and in the following year described a new genus of *Vespertilionidæ*. It was the general esteem in which he was held by the leading naturalists in the United States that obtained for him in 1865 the Professorship in the University of Pennsylvania.

Between 1861 and 1897 Dr. Harrison Allen published ninety seven scientific (not medical) articles, most of them containing the results of much research, and some of them attaining a position among the scientific classics of the language. An inspection of the list of the memoirs which is appended will show that in zoölogy his publications are chiefly concerned with the bat family, whilst his anatomical studies included anthropology, and ranged over almost the whole vertebrate world. In 1869 appeared his *Outlines of Comparative Anatomy and Medical Zoölogy*, a book of two hundred pages, which was the epitome of his public lectures, and which reached the second edition in 1877. In 1884 was published his *System of Human Anatomy, Including its Medical and Surgical Relations*, a huge quarto of over eight hundred pages, illustrated with one hundred and nine full-page lithographic plates, almost every figure on which represents an original drawing made from the dissections of the author. The labor given to the preparation of this book extended over many years. It included not only an enormous amount of work in dissection, anatomical study and description, but perhaps as much expenditure of time in the search for illustrative cases of accident or disease, a search which included within its scope not simply anatomical and surgical but also medical literature, and was therefore in its boundaries co-extensive with the science and art of medicine. It may well be questioned whether there has ever come from the American medical press any book showing a greater profundity of knowledge of the literature of the profession. The size and costliness of the volume, its shape and its mere physical awkwardness,

rather than any defects in the arrangement, the text, or the illustrations, have been the reasons that the work has never gone to a second edition. It remains a monument to the industry and the accuracy of the writer, useful chiefly to the small section of the profession who wish to push their knowledge of anatomy to the furthermost details.

Immediately before or directly after his resignation from the United States Army, Dr. Allen was selected to be Professor of Zoölogy and Comparative Anatomy in the Auxiliary Faculty of Medicine in the University of Pennsylvania. The first course was given in 1866, and the last in 1879, when the Doctor was elected to the Chair of the Institutes of Medicine in the same University. His resignation from the latter position in 1885 was brought about—in part, through a lack of rugged physical health, so that the labor of teaching a large class was felt by him as a great drain upon his strength—in part, by his lack of love for the subject which he taught, and in part by the ever-present desire to reserve such of his intellectual and physical powers as were not expended in meeting the growing demands of his practice for the making of original researches. The mind of Dr. Allen was that of an anatomist; and the structure and homologies of organs interested him far more than did their functional activities. The only domain of physiology whose study gave him personal enjoyment was that of animal movement in which the anatomical relation of muscles and of groups of muscles is the chief matter of investigation. He probably never wrote a physiological memoir not connected with the subject just-mentioned, and during his whole life, so far as my intimate personal knowledge of his daily occupation goes, never made a major physiological experiment.

Although Dr. Allen was never a very forcible nor a distinctly eloquent speaker, as a teacher of anatomy he had been clear, enthusiastic, and attractive; and at a time when there was no available American physiologist the high esteem in which he was held as a scientific investigator and teacher led the Faculty of Medicine in the University of Pennsylvania to ask for

his election to the Chair of Institutes, although every one knew that his studies had hitherto been in different lines. His acceptance of the Chair was without doubt largely founded upon the absence of any anatomical prospects. At that time the Chair of Anatomy in the University of Pennsylvania was filled by Dr. Leidy, whilst Dr. Agnew held in an unloosable grasp the private anatomical teaching of the city. There was not room for a third great anatomical teacher in Philadelphia. Nevertheless, in a physiological professorship Dr. Allen was really out of place; and when a growing practice put him in easy pecuniary circumstances, it was no doubt with a sense of relief that in 1885 he stepped from the Chair of the Institutes in the Medical Faculty back to his old Chair in the Auxiliary Faculty, where from the pure love of the subject, with the merest shadow of a salary, he continued until the year of his death to explain to the worthy few the anatomical wonders of creation.

The strictly professional life of Dr. Allen affords a striking example of the surprising results which are often produced in the career of men by accidents of early manhood. The months which he spent in studying dentistry were for many years viewed by him with great regret as a period of complete waste of time and labor, and yet in fact during these months were laid the foundations of his greatest practical success. After his return from the army his especial experience and reputation combined with his natural tastes to lead him into surgical paths, and enabled him to obtain excellent surgical positions. From 1870 to 1878 he was surgeon to St. Joseph's Hospital; from 1874 to 1878 to the Philadelphia Hospital. Although a good operator, of excellent judgment, he did not in private practice secure commensurate reward. The experiences of war had been shared in by so many that the whole American profession was at that time surgical, and the competition extreme. By temperament and habit Dr. Allen was not fitted to push himself in the crowd. Moreover, a peculiar mental trait, which became when properly applied the source of success, was distinctly detrimental to him as a

general surgeon. His mind had an extraordinary fondness for detail, and in the presence of some new fact or observation, perhaps of minor importance, his power of intellectual perspective was often for the moment lost, so that, in observing and following out the minute, the essential large thing for the time being dwindled to his vision, although subsequently the detail, at first in itself to him so important, might become the suggestion of a really large and valuable generalization. By this mental characteristic, notwithstanding his breadth of culture, Dr. Harrison Allen was fitted for specialism in medicine.

The months spent in the office of Dr. Flagg not only gave him special knowledge and interest in purely dental matters, but also gave direction to his studies, so that as early as 1869 he published an important paper on "Facial Deformation." and gradually became more and more an authority in diseases of the mouth. It was by virtue of his dental training and his natural fondness for minute details, that in a case of epilepsy which had been long under my care without avail, he was led to notice that a certain tooth had the character of a milk rather than of a permanent tooth; on extraction he not only found the second tooth which had failed to erupt, but by giving relief to the local irritation cured the epilepsy which was really a reflex phenomenon. From the mouth to the throat, from the throat to the nose, was a most natural sequence, and here results were to be achieved by close attention to and study of the minutest detail; and so at last the man whose sympathies and studies had been most broad found the natural application of broad knowledge to minute detail for which by nature he was best fitted. In this way Dr. Allen became, as he has been termed, the father of modern rhinology.

It was not only in practical matters but also in scientific research that his early dental study bore fruit. It is asserted by dentists that when exanthematous fevers occur at a certain period of teeth-eruption they leave a permanent mark upon the teeth, so that it is possible to say in after years that the subject has at a certain age suffered from a severe exanthematous fever. Believing this to be a fact from his own obser-

vation, Dr. Allen's mental characteristics led him to the further conception that probably the exanthematous diseases affect not simply the teeth but the whole facial and cranial anatomy, and at the time of his death he was engaged upon a wide comparative study of the skulls of civilized and barbarian peoples to determine if possible whether acute disease in early life affects cranial development.

As already stated, the original mental character of Dr. Allen was such that he was especially attracted by the mysteries of animal structure and by the wonderful relationships which bind such structure into a harmonious whole throughout the animal creation; but to this scientific endowment there were joined a poetic temperament and a dreamy moodiness which made its possessor singularly sympathetic with the moods of nature as shown in landscape and sea, and led him through a loving study of nature as represented in art to the development of deep artistic tastes and sympathies. Out of this composite attitude grew his *Analysis of the Life Form in Art*, which appeared in 1874 and received especial commendation in the London art publications.

But the sympathies of Dr. Allen were even wider than has yet been noted. A great naturalist is rarely a man of books; he longs to get close to nature itself, and the book is to him only an instrument by means of which he digs out the great treasures from nature's storehouse. But Dr. Allen was a great lover of books; possibly not with the enthusiasm of the true bibliophile, who half insensately loves the book itself, but as one who views books as revelations of human minds through different ages—as indices of human thought showing at once the progress and the essential unity of the race. He had no love for out-door sports; exercise was irksome rather than attractive. Though in verity a student of dry bones, he dwelt in the valley of the prophet, and clothed by his imagination these bones with living flesh. He was a dreamer who would dream, as he lay prone before a beautiful landscape, the happy hours away; or who, with equal pleasure, sitting himself down among the dusty tomes of some old library, would hold com-

munion with the dead. The quaint engravings, the frontispieces, and the tail-endings with which the old scientists lightened their labors; the odd sayings, the shrewd observations which the great men of yore noted as they peered, half seeing, through the misty twilight of a scientific dawn, brought to Dr. Allen a delight which those of us who are more prosaic can hardly understand. To him the old records were a beautiful land through which walked and talked the worthies, who, being dead, to him still spoke. Men often thought him impracticable and a visionnaire, when he was but a poet in the realm of science.

Personally, Dr. Allen was a man of medium height, but rather slight in form, with an expression of countenance and general appearance which gave the impression of no great physical vigor, but of much intellectual force. A certain reserve of manner and dignity of bearing impressed favorably almost every one whom he met. His gentleness, perhaps, at times gave a suggestion of weakness, which, however, rapidly disappeared in those with whom he came in contact as a superior officer or to whom he ministered professionally. A peculiar union of delicacy and firmness of touch was very evident in his manipulations in later life, and very rarely failed at once to gain the confidence of his patients. Of excellent conversational powers, taking his part always in familiar social intercourse, Dr. Allen was nevertheless a reticent rather than a talkative, a retiring rather than a pushing man. In his dealings with his professional brethren he was very observant of the most minute ethical proprieties; always sympathetic and helpful to the younger practitioners, always fraternal to the men of his own age. To the poor he was at all times the conscientious physician, willing to give service without expectation of any commensurate reward. Like most men who accomplish important work in the world, in the earlier part of his career he rarely gave up time to social intercourse, but as failing strength made incessant labor an impossibility his natural fondness for companionship asserted itself more and more, and especially led to the gratification of the musical

taste which had always been a rather striking characteristic in one of whom it might have been presupposed that the banishment from religious scruples of all musical culture for successive generations of ancestors would have led to an inherited lack of musical appreciation and ability.

A strong trait in the character of Dr. Allen was an intense serious earnestness which not only made him a persistent student and worker, but also forbade his passing by the great problem of life, so that he was always a deep thinker upon religious matters. Educated as a Hicksite—*i. e.*, Unitarian—Friend or Quaker; led by associations and study in early and middle life toward agnosticism and materialism, he passed through many phases of religious conviction, but became firmly convinced of the great truths of evangelical Christianity and died an openly professing Christian, full of hope of immortality to come.

In its entirety the physical, moral, and mental character of Dr. Harrison Allen was a very uncommon one. In natural endurance and the power of work he probably was about the average, but by his untiring industry he accomplished enormous labors. To good reasoning powers and judgment he added a great natural fondness for the study of nature itself, and an equal fondness for the study of books; a temperament which was reflective, almost moody, in the pleasant sense of that term; an imagination which was very active; a curious fondness for detail which was remarkable; and a power of seeing for himself that made him a great observer. By virtue of his natural endowments in the face of difficulties he accomplished a mass of work, original in character and extraordinary in the fields that it covered; and he will undoubtedly rank among the greatest of the men who have made the College of Physicians of Philadelphia illustrious during the nineteenth century.

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1861. Description of New Pteropine Bats from Africa—Hypsignathus monstrosus; Epomorphorus comptus; Pteropus mollipilosus. Proceedings of the Academy of Natural Sciences of Philadelphia.

Description of a New Mexican Bat. C. Mexicanus. A. N. S.

1862, 1863. Lasiurus intermedius. Vespertilio nitidus. A. N. S.

1864. Monograph of the Bats of North America. Revised 1863. United States National Museum Bulletin.

1865. On a New Genus of Vespertilionidæ. Corynorhinus macrotus, C. townsendii. A. N. S.

1866. Note on the Vespertilionidæ of Tropical America. A. N. S.

1867. On Certain Features of Interest in the Conformation of the Mammalian Skull. A. N. S.

Remarks on the Tertiary Occipital Condyle. A. N. S.

The Jaw of Moulin Quignon. Dental Cosmos.

Temporo-frontal Suture. A. N. S.

1869. Outlines of Comparative Anatomy and Medical Zoölogy.

1870. On the Plan of Construction of Limbs. A. N. S.

The Proper Method of Studying Monsters. A. N. S.

1872. On the Appendicular Skeleton of Vertebrates. A. N. S.

1874. An Analysis of the Life Form in Art. American Philosophical Society.

1875. On the Notation of Ribs. A. N. S.

On the Effect of the Bipedal Position in Man. A. N. S.

1876. A Human Skull Exhibiting Unusual Features. A. N. S.

Zoölogical and Biological Methods of Research. A. N. S.

Supernumerary Anterior Extremity in a Brahmin Cow. A. N. S.

Supernumerary Anterior Extremity in a Domestic Cat. A. N. S.

1880. Mammary Glands of Bats. A. N. S.

Description of a Fœtal Walrus. A. N. S.

On Some Homologies in Burodont Dentition. A. N. S.

Phalanges of Bats. A. N. S.

Ethmoid Bone in Bats. Bulletin of the Museum of Comparative Zoölogy.

On the Temporal and Masseter Muscles of Mammalia. A. N. S.

1882. Muscles of the Limbs of the Raccoon. Procyon lotor. A. N. S.

Distribution of Nerves. A. N. S.

Vitality of Fresh Water Polyps. A. N. S.

Asymmetry of Turbinated Bones. A. N. S.

Irregularities of the Dental Arch. A. N. S.

A Revision of the Ethmoid Bone in the Mammalia. Museum of Comparative Zoölogy, Cambridge, Mass.

1883. The Spinal Cord of Batrachia and Reptilia. A. N. S.

Cutaneous Nerves in Mammals. A. N. S.

1884. On the Nomenclature of Palatal Rugæ. A. N. S.

1885. On the Pectoral Filaments of the Sea Robin. Prinotus palmipes. A. N. S.

The Shape of the Hind Limbs in the Mammalia as Modified by the Weight of the Trunk. A. N. S.

1886. On the Type of Tooth Structure in the Mammalia. American Naturalist.

On the Tarsus of Bats. American Naturalist.

On the Temporal and Masseter Muscles of Mammals. A. N. S.

On a Post-Tympanic Ossicle in Ursus. A. N. S.

Muscles of the Hind Limb of Cheiromeles torquatus. Science.

On the Coloration of Mammals. Science.

1887. Notes on the Anatomy of the Indian Elephant. Journal of Comparative Medicine and Surgery.

Material for a Memoir on Animal Locomotion. Being a series of studies on the instantaneous photographs taken by Mr. E. Muybridge. A. N. S.

A Prodrome on a Memoir of Animal Locomotion. A. N. S.

On the Flight of Birds. Science.

1888. On the Palatal Rugæ in Man. A. N. S.

Distribution of Color Marks in the Mammalia. A. N. S.

Notes on the Osteology of Carnivora. Science.

1889. On the Taxonomic Values of the Wing Membrane and on the Terminal Phalanges of the Digits in the Cheiroptera. A. N. S.

Remarks on the Pranghorn (Antilocapra). American Philosophical Society.

The Genus Nyctinomus and Description of Two New Species. N. europa and orthotis. American Philosophical Society.

On a New Species of Carollis, with Remarks on Carollis crevicauda. American Philosophical Society.

Description of Two New Species of Bats, Nyctinomus europa and N. orthotis. Proceedings of the United States National Museum.

On the Coloration of Mammals. Science.

1890. On the Distribution of Color Marks in the Pteropodidæ. A. N. S.

Description of a New Species of Macrotus (M. bulleri). American Philosophical Society.

Description of a New Species of Pteropus (P. planigera). American Philosophical Society.

Description of a New Species of Bat (Atalapha semota). Proceedings of the United States National Museum.

Description of the Genus Carrolis and C. brevicauda (C. castanea). Proceedings of the United States National Museum.

1891. On a New Species of Atalapha (A. teliotus). American Philosophical Society.

A New Genus of Vespertilionidæ, Euderma. A. N. S.

Description of a New Species of Vampyrops. V. zarhinus. A. N. S.

The Influence Exerted by the Tongue on the Position of the Teeth. A. N. S.

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Pædomorphism. A. N. S.

Change of Name of a Genus of Bats. A. N. S.

1892. On the Cephalo-humeral Muscle and the so-called Rudimental Clavicle of Carnivora. A. N. S.

On the Molars of Pteropine Bats. A. N. S.

Mechanism of the Mammalian Limb. Boston Medical and Surgical Journal.

On the Foramen Magnum of the Common Porpoise and on a Human Lower Jaw of Unusual Size. A. N. S.

On a New Subfamily of Phyllostome Bats. A. N. S.

Description of a New Genus of Phyllostome Bats. Ectophylla. United States National Museum Bulletin.

On the Temminck's Bat. Scotophilius temminckii. United States National Museum Bulletin.

1893. The Form of the Edentulous Jaw in the Human Subject. A. N. S.

Introduction to Monograph of N. A. Bats.

Notes on the Genera of Vespertilionidæ. United States National Museum Bulletin.

Monograph of N. A. Bats. Bulletin of the Smithsonian Institute.

Notes on the Mechanism of the Act of the Expulsion of Secretion from the Anal Sac of Mephitis. A. N. S.

1894. The Objects of the Wistar Institute. University Medical Magazine.

On the Shortening of the Face Axis in the Evolution of the Mammalia. Proceedings of the Society of American Anatomists.

On a New Method of Determining the Plane of the Skull.

On the Changes which Take Place in the Skull Coincident with Shortening of the Face Axis. A. N. S.

On a New Species of Ametrida. Boston Society Natural History.

Observations on Blarina brevicauda. A. N. S.

Hyperostosis on the Inner Side of the Human Lower Jaw. A. N. S.

1895. Pithecanthropus erectus. Science.

Classification of Skulls. Science.

The Embryos of Bats. Contribution from the Zoölogical Laboratory of the University of Pennsylvania.

1896. On the Ulna of the Common Brown Bat. A. N. S.
On a Uniform Method of Describing the Human Skull. A. N. S.
The Study of the Crania from the Mounds of the St. John's River, Florida. A. N. S.
1897. On Diphylla ecaudata. U. S. N. M.
On Tarsius fuscus. Proceedings of the Boston Society Natural History.
Article on Bats in Zell's Encyclopædia.

Medical Writings.

1862. Brief Account of a Form of Skin Disease Occurring in Manufacturers of Kerosene Oil, Believed to be Undescribed. American Journal of the Medical Sciences.
1863. Post-mortem Examinations as Conducted in the Army Hospitals. Being a summary of 223 autopsies. Transactions of the Pathological Society.
1865. Remarks on the Pathological Anatomy of Osteomyelitis. American Journal of the Medical Sciences.
1867. Purpura Hæmorrhagica. Transactions of Pathological Society and Hayes' Journal.
1869. On Human Osteology. Hayes' Journal.
Modern Methods of Investigation. Cincinnati Medical Reporter, 11.
Description of a Congenital Deformation in the Face. Dental Cosmos and Hayes' Journal.
1870. Localization of Diseased Action in the Osseous System. American Journal of the Medical Sciences.
Intra-capsular Fracture. Transactions of the Pathological Society.
Examination of Tumor. Transactions of the Pathological Society.
Structural Changes in Specimen of Flat-foot. Transactions of the Pathological Society.
Amputation of Leg on Account of Varicose Veins. Transactions of the Pathological Society.
Gunshot-wound of the Neck. Transactions of the Pathological Society.
Report on a Case of Hyperostosis. Transactions of the Pathological Society.
On Certain Peculiarities in the Structure of the Orbit. Hayes' Journal.
Facial Neuralgia. Dental Cosmos and Hayes' Journal.
Anatomy of the Cerebrum. Philadelphia Medical Times.
Topical Applications in Surgery. Philadelphia Medical Times.
1871. Cystic Tonsil. Transactions of the Pathological Society.
A Case of Pectoral Abscess Presenting Some Unusual Features. Transactions of the Pathological Society and Medical Times.
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MEMOIR OF WILLIAM H. FORD, M.D.

By SAMUEL ASHHURST, M.D.

[Read May 4, 1898.]

Sensible as I am of the honor done me by my appointment to prepare a biographical sketch of our late Fellow, Dr. Ford, I accepted the honor all the more gladly as it gives me the opportunity to testify to the virtues and excellences of one who passed through this life too modest to make claims for himself, and gave the best years of that life for the good of his native city, which, to a very great extent, is entirely ignorant of the vast debt it owes to him.

Some time before the close of the last century William and Mary Ford came to Philadelphia from the neighboring village of Chester, as it was then. In 1796 they had born to them a son, William, who married, and in turn had a son, the third William, the subject of this sketch, who was born in Philadelphia on October 7th, 1839. His father, who was a successful merchant, sent the son to Lawrenceville School at the age of twelve years. There he remained for four years, when he entered Princeton, and graduated therefrom in 1860.

Having finished his academical career with honor, Ford matriculated at Jefferson Medical College, and was a student there during the exciting days some of us remember as preceding the outbreak of the war of the rebellion.

Although he had not obtained the degree of M. D., William H. Ford, as was the case with many others, offered his services to the Government on the breaking out of the war, and for a time served as acting medical cadet, being in active service on

the Pamunkey during the sad and confusing days of the Peninsular Campaign.

Having received the degree of M.D. in 1863, Dr. Ford was commissioned Assistant Surgeon of the Forty-fourth Pennsylvania Volunteers, and afterward was promoted to be its surgeon. After the battle of Gettysburg he retired from the service to accept the appointment of Resident Physician at the Philadelphia Hospital, a position he filled for two years, until the close of the war.

Like so many other young men who had been detained at home by the struggle for national existence through which our country passed during those sad but stirring four years, Dr. Ford, in 1865, went abroad to secure the advantages which could then only be had there, and for three years, at Bonn, Berlin, Heidelberg, Vienna, Paris and London, he devoted himself with such success to special lines of study that his reputation stood high as an expert in throat affections both with the clinical professors and the students, his contemporaries. Especially is he remembered by his then associates for his skill in the use of the ophthalmoscope.

After residing abroad nearly three years, in 1868 Dr. Ford returned to his native city and began the practice of his profession. He was elected a member of the Pathological and Obstetric Societies and a Fellow of this College. Recognized by all who knew him as a thoroughly scientific physician, possessed of professional attainments to an unusual degree, for some time he was associated with the editorial conduct of the *Philadelphia Medical Times*, which was then starting under the guarantee of members of the profession, at a time when the impetus given to modern medicine by rapidly advancing discoveries and improved methods marked the beginning of a revolution of which the end is not yet. My acquaintance with Dr. Ford began at that time, and the high estimate I then formed of him grew and strengthened through succeeding years.

In 1871 Dr. Ford was appointed a member of the Board of Health, and continued such until the time of his death. For

the last eleven years of his life he was President of the Board, and those who were associated with him from time to time will not question my assertion that, practically, he was the Board of Health, and that to his untiring labors is owing the progress made therein, until in efficiency and value it has few superiors among the sanitary organizations of the country.

No one unfamiliar with the obstacles he had to overcome can appreciate fully the importance of Dr. Ford's labors in this, which proved to be his life-work. The Board consisted largely of business men who, however valuable from their practical qualities, were ignorant of sanitary science. It, therefore, naturally looked up to the medical men who were a minority in it for everything of a really scientific character, and it was not long before the thorough knowledge possessed by Dr. Ford, backed by the directness and purity of his personal character, gave him great influence in its councils and caused the Board to defer absolutely to his counsel in all matters affecting the public health. Aided by such men as Dr. Cleemann and other medical men who were from time to time associated with him, Dr. Ford reorganized the registration bureau and exercised a careful supervision over the certificates of death sent in by the profession, from which is compiled the weekly bulletin sent in exchange to the principal cities of Christendom.

As Chairman of the Sanitary Committee Dr. Ford was indefatigable in superintending the conduct of the Municipal Hospital, which, several times during his connection with the Board, was filled to its utmost capacity during epidemics of smallpox, diphtheria, etc. Under his direction was built the first disinfecting chamber in this country, which, though long since destroyed by fire and superseded by a more efficient structure, was in its day most useful, being built without any further expert assistance than that rendered by an intelligent furnace man.

Undisturbed by the constant efforts of real-estate speculators to remove the Hospital to a great distance from the centre of the city, thereby increasing much the risk to those patients

obliged to seek its shelter, Dr. Ford repeatedly secured from City Councils the appropriations necessary for the enlargement and improvement of the Hospital, the members of the municipal government soon coming to recognize the ability, purity and unselfishness of the man, and being satisfied that the funds placed at his disposal would neither be wasted nor misapplied.

Under his inspiration a well-equipped and well-conducted Bacteriological Laboratory was established in connection with the Board of Health and placed in charge of a distinguished specialist, members of Councils here also being willing to be entirely guided by Dr. Ford in a matter about which they were necessarily uninformed.

To Dr. Ford's efforts also Philadelphia is indebted for the thorough supervision of its milk supply which it now enjoys, and for the odorless method of emptying privy wells which has been substituted for the old and horrible night-cart system.

All of these matters so briefly stated required long patience and untiring energy on the part of Dr. Ford, and with cheerfulness he gave the time and effort necessary for their accomplishment freely, and without other compensation than the approval of his own conscience and that of those few who were acquainted with his worth and who knew how thoroughly fitted through his exertions is the department of health to do the work entrusted to it in Philadelphia.

It would consume much time to go into further details of the work done in the Board of Health by Dr. Ford during the twenty-six years he remained in it. Only those who are familiar with the workings of that Board can know how much of time and painstaking labor he gave to it, and they saw his hand in almost every detail. Few men have been more largely benefactors of the city in which they dwelt, none are more worthy of the praise of their fellow-citizens.

Dr. Ford was a facile and graceful writer, as well as a thoroughly equipped and scientific physician, yet he contributed but little to professional literature. The results of his labors will be found in the published reports of the Philadelphia

Board of Health and in the innumerable special reports he presented to the Board upon subjects and cases referred to him or the committees of which he was the chairman. Too often the presentation of such reports was a veritable casting of pearls before swine, and those who might have benefited by them were indifferent to their scientific value. Buried among the unpublished records of the Health Office it would be easy to find abundant proof of Dr. Ford's literary ability. But he was taken away at that time of life when he might have been expected to produce a work of permanent and general value.

The last time I saw Dr. Ford was in June, 1897, when, in conversation, he spoke of some trifling but annoying pains of a rheumatic character in the chest. He spoke slightingly of them, but they were precursors of the end. He spent the summer in a cottage on the coast of New Jersey, going backward and forward to attend to his duties in Philadelphia. On October 18th, after a canoe trip not involving violent exercise, he was taken in the early afternoon with violent pain over the cardiac region, with great oppression, and in a very few minutes, even before his anxious wife could obtain the aid of a physician, he died.

On October 26th the American Public Health Association, of which Dr. Ford had been long a prominent member, convened in Philadelphia, and there was read at its sessions a paper prepared by him, entitled, "The Story of Sanitation in Philadelphia," and his Honor, Charles F. Warwick, Mayor of the city, made the following truthful and appreciative remarks at a meeting of citizens held October 19th to prepare for the entertainment of the convention:

"I cannot let the occasion pass—indeed, I feel I would be neglecting my duty if I allowed this meeting to adjourn without saying a word or two relative to the loss we have sustained in the death of Dr. Ford. A more honest, conscientious and devoted public servant I never knew. His life was kindly and devoted to humanity. He spent the best years of his life in the public service, laboring for you, for me, and the commu-

nity. His reputation, too, was not confined to this city, for, wherever the public health was a consideration, there his worth was known and his work respected.

"As an executive, I cannot speak too highly of him, nor can the city bestow too much praise on such a man. We would all do wrong did we not stop and drop a tear in memory of one of the truest and most devoted men to humanity it has ever been my pleasure to meet. Not till he has been taken from us do we realize the extent of his good work. Some of his most devoted friends will not know his worth until the whole story of his life is written."

For seventeen years Dr. Ford was a manager of the American Sunday-school Union, and we extract these few lines from the minutes adopted by its Board, as prepared by Rev. Dr. Crowell, the Secretary of Missions:

"We recall, with pleasure, the many years of our intercourse with him, his wise judgment, his safe counsel, his kind sympathy with our missionaries, and his intelligent appreciation of the magnitude and importance of their work. His genial manner, his buoyant cheerfulness and his sincere piety endeared him to us."

For many years he was one of the Physicians to the Foster Home, and was valued by its Managers as few men are. He was for a long time a consistent member and officer of the First Baptist Church in Philadelphia, so long presided over by Rev. George Dana Boardman, D.D., and active in its cares and responsibilities.

His character has been sufficiently made clear in what I have already written, and fear lest the strong personal affection which existed between us may cause me to trespass on your patience warns me to forbear. A thorough gentleman, a trained and accomplished physician, reticent, and with an eminently judicial frame of mind, an unselfish friend, and, above all, a devout believer in and follower of the Lord Jesus Christ, Dr. Ford will be long missed, and his death has inflicted another of those losses to which recurring years inevitably lead though they do not accustom us.

MEMOIR OF THOMAS D. DUNN, M.D.

By G. E. de SCHWEINITZ, M.D.

[Read December 7, 1898.]

By the request of the President of the College, with which request I gladly comply, I invite your attention to a brief history of the life and work of our late Fellow, Dr. Thomas D. Dunn.

Dr. Dunn was the oldest son of Rev. Thomas H. Dunn and Diantha M. Dunn, and was born in Crawford County, Pennsylvania, on January 30, 1854. His great-grandfather, Philip Dunn, came to this country from Scotland, first settled in New Jersey, and later in the region known as Crawford County. He was a soldier in the Revolutionary War. His grandfather, Gideon Dunn, was married to Rachel Holton, the only white woman surviving the Indian massacre at Sandusky, Ohio. He served through the War of 1812.

With such ancestors, in whose veins flowed the good Scotch blood, whose lives had been passed amid the dangers and trials incident to the colonization, development, and liberation of the New Country, and who had acted their parts bravely and well, it is not surprising that Dr. Dunn was possessed of an unobtrusive courage and quiet determination which were marked characteristics of his career.

When only a boy the work of the Sanitary Commission during the Civil War excited his lively interest, and he decided to become a physician. Without means to carry out this treasured project, he began, as soon as possible, to earn the necessary money by teaching during the vacations of the years —two in number—which he required to complete his normal

school course; by obtaining the position of Principal of the Public Schools in Tionesta, a position he filled with eminent satisfaction, and, later, by taking charge of one of the dairy farms of Dr. Jacob Price, in West Chester, with whom, as preceptor, he began the study of medicine in the spring of 1878.

In the fall of the same year he entered the Medical Department of the University of Pennsylvania, and for the next three years pursued his studies with unflagging interest, with singular conscientiousness and with distinguished success. He was graduated in March, 1881, with distinction, receiving honorable mention for his thesis on "Hæmophilia," and a gold medal "for diligence, care, and skill in the practical study of anatomy."

He was successful in the competitive examinations for Resident Physician in the University Hospital and Children's Hospital, and served one year in the former and six months in the latter institution. In October, 1882, he began the practice of medicine in West Chester.

From the outset Dr. Dunn was well equipped for his life's work, and speedily acquired a prominent position in the town and county in which he had settled. His colleagues, as well as the community, recognized his marked abilities and gave him the fullest measure of respect and confidence. Always watchful of the means by which he could best serve those who came under his care, he was soon impressed with the need of a hospital in the town, but did not find the time auspicious until 1892, when, in an address before the West Chester Philosophical Society, he urged the necessity of establishing such an institution. His appeal met with ready response, and in March, 1893, the Chester County Hospital was opened. This institution owes its success, in the broadest sense of the word, largely to Dr. Dunn. He bestowed upon it an amount of thought and labor which can be realized and appreciated only by those who were his immediate colleagues and helpers in this work.

The strain of this undertaking and the ever-increasing responsibilities of his practice told heavily upon him, and in the spring of 1896, after a severe illness, he was utterly broken

down and obliged for some months to seek the rest which in previous years, although richly earned, he had ever denied himself. On his return, although his strength was not fully restored, he resumed his practice with his accustomed conscientiousness, and in addition devoted himself to the successful establishment of a laboratory for clinical and bacteriological research in connection with the hospital, and which is now known as the Thomas D. Dunn Bacteriological Laboratory—a worthy monument to the work of this faithful man.

On February 26, 1898, while being driven to the house of a patient, through the carelessness of the coachman the buggy was overturned and Dr. Dunn severely injured. For weeks he suffered intensely, and on the evening of April 30th went into collapse. The next day he had somewhat rallied, and as the symptoms pointed to abdominal, perhaps pancreatic, hemorrhage, after a consultation between Dr. Jacob Price, Dr. J. H. Musser, Dr. W. T. Sharpless, and Dr. Edward Martin, an exploratory laparotomy—to which Dr. Dunn not only consented but which he himself urged, for he reviewed the opinions expressed at the consultation with judicial calmness—was performed by Dr. Martin, and the source of the hemorrhage found to be a rupture of the vessels of the pancreas. All that surgical skill and medical science could do was done. For a time he rallied, but gradually sank and died May 6, 1898. His wife, Kate C. Dunn, to whom he was married in November, 1883, and one daughter, Rachel, survive him.

Dr. Dunn was a practitioner of medicine and surgery of the best type. Of him his immediate colleagues have publicly testified, "he was a hard student, a careful observer, a shrewd reasoner, a skilful and accomplished physician." Willing and alertly ready to use the advantages offered by modern progressive medicine—with which he kept in constant close touch—he was properly cautious in regard to "new remedies" and "new methods," which he studied with care before he accepted them, and he never sacrificed on altars erected to imperfectly known and improperly tried agencies.

As he was an earnest student of the literature of medicine,

so also he did not neglect his own contributions, and his scientific papers are records of conscientious clinical observation. Particularly noteworthy are his contributions to the subject of hæmophilia, on which he may be said to have been a leading authority.

In his capacity as Consulting Physician to the Home for Epileptics at Oakbourne, Attending Physician to the James C. Smith Home for Convalescents, and Chief of Staff of the Chester County Hospital, he rendered ample public medical service; and as a member of the Chester County Medical Society, Pennsylvania State Medical Society, American Medical Association, Pathological Society and College of Physicians of Philadelphia, he contributed his share to medical deliberations.

He was singularly faithful to his patients and inspired the fullest measure of confidence. Of him it has been publicly said, "his personal interest in his patients, his sympathy with suffering, and his gentle thoughtfulness for others endeared him in a remarkable degree to all with whom he came in contact." Day and night, for fifteen years, he served the community of West Chester, often going far to answer calls when he himself was suffering intensely, for he was not physically strong and was much afflicted with pain. He was very kind to the poor and to children, and the many calls of weeping servants and working people on the day before his funeral, and the groups of silent, sorrowing children coming to pay a last tribute to this good physician, tell better than words can of the life he led among them.

Dr. Dunn was keenly alive to the responsibilities of good citizenship, and ready in all ways within his power to further any improvement in his adopted town. What he believed to be right he earnestly advocated and tenaciously supported. The Chester County Hospital is a lasting monument to his public-spiritedness.

Dr. Dunn was fortunate in his surroundings, in the associations of his professional brethren and immediate colleagues, and, indeed, in all his affiliations. He was keenly alive to these advantages, and to none more so than to his training

under the eye of so experienced a practitioner as Jacob Price, who to the end remained, as he had begun, not only his preceptor but his loving friend.

Of the singularly warm personal affection and trust which Dr. Dunn invariably inspired, of his charity to the poor, of his forgiving spirit when he was aggrieved, of the beauty of his home life, I need not, indeed, I may not speak. As such a man all his friends knew him. But, Fellows of the College, there is no finer guild than that to which we belong, and to describe one who was an honored member as "a practitioner of medicine and surgery of the best type" is to pronounce the highest eulogy. For Dr. Dunn truly regarded medicine as a science and an art; he worked for the work's sake, he was faithful as his conscience was alert, he was kind because his heart was gentle, and he loved truth, and spoke it.

That one who knew and loved him best once wrote to me, "You remember how fond Dr. Dunn was of Holmes? Do you recall Holmes's description of Dr. Ware?

'A whiter soul, a fairer mind,
A life with purer course and aim,
A gentler eye, a voice more kind
We may not look on earth to find.
The love that lingers o'er his name
Is more than fame.'

Could there be a truer description of Dr. Dunn?" I think not.

Contributions of Dr. Dunn to Medical Literature.

1. Hæmophilia. American Journal of the Medical Sciences, 1882.
2. The Hypodermic Use of Cocaine in Migraine and Bronchial Asthma, 1888.
3. Two Cases of Glossy Skin, with Causalgia following Injuries of the Nerves, 1888.
4. Hæmophilia. Keating's Encyclopædia of Diseases of Children.
5. Ligation of the Common Carotid Artery in a Child of Three and one-half Years for Hemorrhage following Peritonsillar Abscess; Recovery, 1891.
6. Address in Obstetrics before Pennsylvania State Medical Society, 1893.
7. Peliosis Rheumatica in a Bleeder, 1893.
8. A Case of Leukæmia, with Rare Lymphoid Growths of Orbits and Parotid Gland, 1894.
9. A Probable Case of Auto-infection, with Some Remarks on the Bacteriological Origin of Puerperal Sepsis, 1894.
10. Double Hemiplegia, with Double Hemianopsia and Loss of Geographical Centre, 1895.
11. Some Sequelæ of Typhoid Fever, 1895.
12. Auto-infection, 1895.
13. A Case of Parasitic Chyluria, 1896.
14. Rupture of the Quadriceps Tendon, 1897.

INFECTIOUS MULTIPLE GANGRENE OF THE SKIN.

By MILTON B. HARTZELL, M.D.

[Read January 5, 1898.]

The recorded cases of multiple gangrene of the skin include two distinct varieties which differ considerably in their clinical features and are widely separated pathologically. Doutrelepont, Kaposi, Renaut, Bayet, Duhring and others have reported cases under various names, occurring for the most part in nervous or hysterical women, which were, without doubt, tropho-neurotic in nature. In these the cutaneous lesions were usually flaccid vesicles or bullæ, less frequently pustules, occurring in some instances in more or less well-defined groups, followed in a short time by gangrene of the skin, as a rule, superficial in extent, but in exceptional cases causing extensive losses of tissue. The course of the disease was commonly irregular, now better, now worse, lasting from a few months to several years. In a much smaller number of cases an infectious origin has been demonstrated by the finding of special micro-organisms in the lesions which culture and inoculation experiments proved to be pathogenic; or their infectious nature has been reasonably inferred from their symptoms and course.

The following case presents a somewhat unusual type of infectious gangrene of the skin, being characterized by some clinical and bacteriological features not noted in those hitherto reported:

Mrs. H. B., aged forty-six years, the wife of a farmer, pale and somewhat emaciated, was first seen in August of last year, through the courtesy of Dr. Zook, of Newville, Pa., under whose care she had been for three or four years. At the time of this first examination there were present upon the arms and legs six or eight perfectly round, deeply excavated, sharply

circumscribed ulcers, and innumerable very white, mostly circular, smooth, slightly depressed scars varying in size from a pea to a silver dollar. Upon the right shoulder over the deltoid muscle was an especially large ulcer, two and a half or three inches in diameter, and extending down to the superficial fascia, the large size of this lesion being due to the fact that it had been allowed to pursue its course without treatment of any kind for three or four weeks. Some of these ulcers presented healthy granulating surfaces, others were covered with grayish or black, moist sloughs. Five weeks later the patient again came under observation in the wards of the Methodist Hospital of this city, to which she had come for the further study and treatment of her malady. Upon her admission to the hospital there were present a number of lesions in various stages of development or involution, a few upon the trunk, but the majority upon the arms and legs. Upon the upper part of the chest were four circular, thick, black crusts, beneath which were shallow, granulating ulcers about an inch in diameter. About the centre of the flexor surface of the left forearm was a pea-sized, oval, black eschar surrounded by an elevated vesicular ring an eighth of an inch wide, about which was a dark-red inflammatory areola, the whole bearing a close resemblance to vaccinia just before the contents of the vesicle have become purulent. This lesion was the seat of considerable pain, and was very firm and tender to the touch. On the inner surface of the left thigh, about six inches below Poupart's ligament, there were three circular ulcers an inch or more in diameter, two of which were clean and granulating, while the third and largest was surrounded by an elevated border quite firm to the touch, on top of which was a flat ill-defined vesicular ring, the bottom being covered with a grayish, loosely adherent slough; this ulcer was also extremely painful. Upon the left leg were several shallow, healthy ulcers, which were rapidly healing; these had been the seat of gangrenous lesions which had been excised before the patient's admission to the hospital. As has already been mentioned, there were, in addition to these active lesions numerous scars, the site of former ones, upon the chin, upper part of the chest, and upper and lower extremities. It is worth noting that the lower part of the chest, the abdomen, and the entire back were wholly free from evidences of disease past or present. The early history of the affection was briefly as follows: Four years ago the patient ran a meat-hook, which had been in use for some time, under the nail of the third finger of the right hand; shortly after this injury a painful spreading ulcer formed in this situation, which was followed by a second just above the right internal malleolus, the disease spreading to the parts of the body already noted. Since the appearance of the first ulcer, four years ago, the patient has never been free from the malady. Some two or three years ago an unusually virulent and destructive lesion appeared under the nail of the left thumb, for which the terminal phalanx of that member was amputated by her medical attendant, all other means taken to prevent the spread of

the ulcer having been without avail. During her stay in the hospital new lesions made their appearance almost daily, at first upon the flexor surface of the forearms, later upon the inner surface of the right thigh. They began either as small, pale-red, slightly elevated papules, which within a few hours were replaced by pinhead-sized, flaccid vesicles capped by a small black crust, or they were vesicular from the beginning, with a minute black or brown crust upon the summit. They grew rapidly, attaining the size of a large pea within twenty-four hours; the central black eschar became depressed as it enlarged, and the whole lesion after two or three days resembled closely a vaccination vesicle six to eight days old. Unless excised or destroyed in some manner they continued to enlarge in all directions, the borders being very firm to the touch, while the centre was occupied by a constantly growing, dry, gangrenous mass, which was in time loosened by suppuration occurring beneath it. It should be remarked here that this suppuration was evidently a secondary process, appearing only after the eschar had reached a considerable size. There was remarkable uniformity in the character of the lesions. As has already been mentioned, for the first few days they were vacciniform in appearance; after the separation of the central eschar they became sharp-cut, round ulcers with elevated firm borders, spreading in depth and circumference, the bottom covered by a grayish or black slough. Although the disease was not attended by any constant general disturbance, the patient was subject to occasional attacks of severe chills followed by elevation of temperature—sometimes amounting to as much as 104° F.—and diarrhœa, these rarely lasting more than a day or two.

Microscopical examination of a number of excised lesions, varying in age from twenty-four hours to five days, showed that the disease involved the entire thickness of the skin. In the centre of the lesion the epidermis was transformed into a homogeneous uniformly staining mass, which blended insensibly with the corium beneath; upon the sides it was lifted bodily from the papillary layer, forming cavities filled with small quantities of coagulated fibrin, degenerating epithelium, and cellular *débris*. The entire thickness of the corium was occupied by small hemorrhages and an enormous number of lymphoid cells, except in the centre of the lesion, where it had been changed into a mass in which formed elements were no longer distinguishable; in the older lesions the papillary layer was completely disintegrated. Far more interesting and significant, however, was the finding of great numbers of bacilli in the lowest layers of the rete and in the papillary and subpapillary portions of the corium, where their growth had resulted in the almost complete destruction of the tissues. These micro-organisms occurred scattered about irregularly or in considerable masses, resembling morphologically the bacillus tuberculosis, staining best with gentian-violet, employed after the method of Weigert; all other methods and stains tried either failed completely to stain them, or gave

very inferior results. Beside this bacillus the ordinary staphylococcus pyogenes aureus was present in large numbers.

The absence of any constitutional symptoms indicating a general infection, and the superficial situation of the bacilli in the early stages of the disease seemed to justify the assumption that the malady was a local one; the limitation of the eruptive lesions to those parts of the body easily accessible to the fingers of the patient suggested the probability that new lesions arose by auto-inoculation. Acting upon these assumptions, an effort was made to destroy the micro-organisms in the lesions by early intradermic injections of a 5 per cent. solution of potassium permanganate, this agent being chosen not because it was regarded as the most effective bactericide, but because it could be introduced into the skin in sufficient quantities without danger of undesirable general effects from its absorption. In addition to these injections the skin was to be washed frequently with a 1 to 1000 solution of mercuric bichloride. Four lesions were injected with the permanganate solution a few hours after their appearance, with the effect of materially retarding their development, but the patient left the hospital too soon to determine whether they were completely aborted. Various forms of treatment had been tried before the case came under my care; but the only effective one had been excision. When the lesions were thoroughly excised, together with a considerable margin of sound skin, the wound thus made rapidly healed; if, however, all of the infected tissue was not removed, as happened frequently, the wound speedily became a steadily enlarging gangrenous ulcer with firm elevated borders, precisely like those which resulted from untreated lesions.

In most of the cases of infectious gangrene of the skin the disease commenced as an eruption of papules, vesicles, or pustules, usually small in number, which, enlarging, were transformed into eschars beneath which circular, more or less deeply penetrating ulcers, with a marked tendency to spread, occurred. The infectious variety is rarely so prolonged in its course as the trophoneurotic form; but that there are exceptions to this rule is proven by the case just reported. Severe constitutional symptoms, such as high temperature, delirium, extreme prostration, have occurred in a considerable proportion of the cases; in one case the disease terminated fatally.

Multiple gangrene may occur as a complication or sequel of some other acute infectious malady. Demme[1] has reported two cases of this character occurring in children who were the sub-

[1] Fortschritte der Medicin, 1888.

jects of a severe attack of erythema nodosum which was apparently contagious, since three children of one family were attacked by it at short intervals. The erythema was accompanied by chills, high temperature (40.2° C.), vomiting, and extreme pains in the legs and arms. One week after the beginning of the attack vesicles, which shortly became pustules, appeared upon the lesions of the erythema, and these in turn were transformed into gangrenous sloughs. A bacillus was found in the lesions, which when cultivated and inoculated into guinea-pigs produced a gangrene of the skin like that observed in the children.

Three cases of gangrene of the skin complicating measles have been reported by Mensi.[1] In the gangrenous lesions were found the staphylococcus pyogenes aureus, a bacillus culturally and morphologically like the proteus vulgaris, and a bacterium resembling the diphtheria bacillus of Loeffler. Inoculation of guinea-pigs with bouillon cultures of the first two produced ulceration like that from which they were originally obtained.

Under the title "A New Species of Gangrene of the Skin, with the Formation of Pustules," Rotter[2] has reported a case of gangrene affecting a considerable area of the skin of the leg which, at the end of the second week, was associated with an eruption of large hemorrhagic pustules, which continued to appear for fifteen months. From pus from the ulcerating surface and the pustules a bacillus was obtained and cultivated which by reinoculation produced upon the patient lesions like the original ones.

Waelsch[3] has recently published a fatal case of cutaneous gangrene occurring in the person of a man who was addicted to the use of morphia hypodermatically, the initial lesion appearing at the site of an injection. From the lesions, which began as abscesses but later became gangrenous ulcers, a bacillus was cultivated which was markedly pathogenic. Simon[4] has likewise reported a case of abscesses and gangrene occurring in a young woman, a victim of the morphia habit; when deprived of her syringe the disease disap-

[1] Gazette Med. di Torino, 1894.
[2] Dermatologische Zeitschrift, 1895.
[3] Archiv f. Dermatologie und Syphilis, Bd. xxxix.
[4] Breslauer Aerztliche Zeitschrift, 1879.

peared, but returned when she got possession of it again. Although no micro-organisms were found in this case—probably because they were not looked for—the probabilities are greatly in favor of its being etiologically identical with the one reported by Waelsch.

As multiple cachectic gangrene, Eichhoff[1] has published a case occurring in a child one and one-half years old, in which, two weeks after an attack of measles, an eruption of dark-red spots, blebs with cloudy contents, and deep ulcers with sharp-cut borders, appeared. Many of the ulcers were covered with dry, black eschars. There was also a marked conjunctivitis, with swelling of the lids and purulent secretion. Microscopical examination of material obtained from the bottom and edges of the ulcers revealed a quantity of fungus corresponding in size and appearance with the trichophyton tonsurans, the quantity of mycelium being remarkable. The conjunctivitis was also mycotic. Eichhoff believes that two cases presenting similar clinical features which he had seen some time previously, and one of which he had reported as an example of cachectic gangrene, were due to the same cause.

In addition to the foregoing cases, in which the presence of a pathogenic micro-organism was positively demonstrated, there remains a small number in which the clinical features of the disease correspond so closely with those of proven infectious nature that they may reasonably be included in the same category, although no micro-organisms were found in them. Hallopeau and Le Damany[2] have described a case characterized by the development of red nodules, in the centre of which a yellowish crust formed after loosening of the epidermis; beneath this crust ulcers with sharp-cut, perpendicular edges and covered with putrescent detritus appeared, which enlarged peripherally. Some of these lesions remained superficial and healed rapidly, others became covered with a dry, black eschar, or becoming markedly indurated, extended into the deeper parts of the skin. Along with these ulcerative lesions the lymphatic glands suppurated, giving rise to necrotic ulcerations. The buccal and guttural mucous membranes were affected as well as the skin. The authors reject the idea of

[1] Deutsche Med. Wochenschrift, 1884.

[2] Annales de Derm. et de Syphilographie, 1895.

a tropho-neurosis in this case, but believe the malady to have been infectious, the lesions multiplying by auto-inoculation.

Boeck[1] has published the details of a case of multiple gangrene in a child, ten months old, which began as red, slightly elevated spots upon the back, breast, scalp, and upper extremities, upon the summits of which vesicles quickly appeared. When these vesicles reached a certain size the centre became depressed and a brownish crust formed, the lesion at this stage resembling closely vaccine pustules nine or ten days old. The crust continued to enlarge until it included the whole lesion, not being simply dried epidermis, but formed by a more or less deep gangrene of the corium. Numerous micrococci were found, but as these did not differ from those present in all inflammatory foci in the skin, no special significance was attached to them.

Janovsky and Mourek[2] have quite recently published a case of cutaneous gangrene which began with an eruption of flat, pale-red, hard and elastic papules surrounded by a red border. Some of these, after enlarging, completely disappeared, leaving the skin slightly pigmented and scaling; others became covered in the centre with a brown or blackish, lamellated, tightly adherent eschar, beneath which was an ulcer with slightly elevated border and steep sides. Repeated examinations of the secretions beneath the crusts, and of the blood, failed to reveal any micro-organisms. Notwithstanding the failure to find these the authors do not reject the infectious origin of the malady, since disease of the bloodvessels, syphilis, or other constitutional disease was not present, and the most careful examination of the nervous system failed to discover any ground for belief in its tropho-neurotic nature.

Lastly, I would include in the same category varicella gangrenosa, of which a considerable number of cases have been reported since Mr. Hutchinson first called attention to the malady.

[1] Ref. Archiv f. Dermatol. u. Syphilis, 1882.
[2] Archiv f. Dermatol. u. Syphilis, 1896, Bd. xxxv.

DISCUSSION.

Dr. Arthur Van Harlingen: I have had no experience with cases precisely like Dr. Hartzell's, and therefore I have very little to say on this subject; but I must congratulate the Doctor and the College on such an admirable record of a rare and unusual case. Had we more such records it would be much easier to form a theory as to the nature of the particular form of gangrene which he has described. As to the occurrence of gangrene in hysteria, such cases, perhaps, should not go in the same category as that described by Dr. Hartzell, as they usually involve the most superficial portion of the skin only. Many cases of hysterical and also of other forms of gangrene are described so inaccurately that it is very difficult to make out exactly to what category they belong. From the most superficial abrasion to the deepest involvement of tissue, all are indiscriminately called gangrene. This deep form of gangrene must be more common than is usually supposed, and should be carefully differentiated from the other forms. I trust that further observations will give us more decided information as to their exact nature. A series of carefully-reported cases like this of Dr. Hartzell's would be of great value.

Dr. Hartzell: Quite recently a variety of gangrene, which may be regarded as midway between the trophoneurotic and the infectious, has been reported by Audry, resulting from the internal administration of iodide of potassium, so that drugs as possible etiological factors must be considered in this connection.

THE NECESSITY FOR PROMPT SURGICAL INTERFERENCE IN TYPHOID PERFORATION; ALSO IN TYPHOID FEVER COMPLICATED BY APPENDICITIS.

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[Read January 5, 1898.]

The hope of eliciting a discussion advantageous to both the surgeon and physician is my reason for presenting a short paper upon the important points in the diagnosis and treatment of typhoid perforation, and of appendicitis complicating typhoid fever, affections in which the necessity for prompt interference cannot be denied.

Perforation plays an important *rôle* in the mortality of typhoid fever; in eighty autopsies Osler found twenty cases of perforation. This condition may sometimes be overlooked, and a few cases undoubtedly recover without operation; but experience has shown that by early recognition of perforation and by prompt surgical interference the mortality of typhoid fever may be to a considerable degree lessened. Appendicitis sometimes occurs as a complication of typhoid fever, and is probably due to an extension of the inflammation from the ileum, attacking the solitary glands of the appendix; the structure, calibre, and lower vitality of the appendix render it much more vulnerable than the ileum to perforative ulceration. Appendicitis arising in connection with typhoid fever may jeopardize the life of the patient, if the appendix is not promptly removed. The presence of typhoid fever does not, in all instances, forbid operation for the removal of the appendix.

To differentiate between perforative appendicitis and perforated typhoid ulcer is usually difficult, and at times even impossible.

The most important point in the diagnosis of typhoid perforation is the history. In the majority of cases the diagnosis of typhoid fever has previously been made, the exceptions being those cases of the walking variety, where the patient has not been under observation at all, or has been seen by the family physician only once or twice as an office patient. Under these circumstances, when the physician has not had the opportunity of studying the case sufficiently to enable him to make a diagnosis, and the patient becomes the subject of perforation, we can plainly see how difficult it would be to determine definitely the nature of the abdominal lesion. The case I report will illustrate this.

Perforation is most common at the end of the second or during the third week. In one of Osler's cases it occurred as early as the eighth day, and in another during the sixth week, two weeks after the evening temperature had become normal (Osler). Perforation may be associated with hemorrhage; but this is not the rule. The exciting cause of the perforation may be indiscretion in diet, vomiting, excessive tympany, and physical exertion. The location of the perforation is usually in the terminal twelve inches of the ileum. It may occur, however, in the colon. The onset of perforative symptoms is sudden; there are vomiting and severe abdominal pain, immediately followed by pronounced general rigidity of the belly-walls and general abdominal tenderness, followed by abdominal distention. Rigidity of the abdominal walls is, in my judgment, a most important and significant sign. In addition to these local signs there may be collapse, as evidenced by a sudden fall in the temperature even to the subnormal, rapid and small pulse, and pinched countenance. If there be general abdominal tenderness and tympanites before perforation occurs, the diagnosis is obscured.

The occurrence of sudden acute abdominal pain, with very decided general abdominal rigidity and tenderness, with or without collapse, is in a typhoid-fever patient the strongest possible indication for immediate abdominal section. To wait after the advent of these symptoms for further corroborative evidence of

perforation is fatal, for septic peritonitis, with a belly full of pus, will surely follow, thus not only adding to the difficulty of operation, but taking away from the patient the only chance for saving life. Why delay should be countenanced, in the light of the strong evidences of the approaching enemy, I cannot understand. It cannot be on the sole ground of objection to opening the belly of a typhoid fever patient. Even in the absence of a perforation an abdominal section could add but little additional danger. This is proven by the case of removal of the appendix in appendicitis complicating typhoid fever which I report, and which ran a typical course after the operation, the patient being bathed as usual, under the direction of my colleague, Dr. J. C. Wilson.

In the presence of symptoms of perforation it is not always conservative to defer opening the belly. Again, this naturally is not a question for the medical man alone to determine, but one in which the surgeon should be called in counsel. Aseptic surgery has enabled the surgeon to meet successfully many conditions heretofore regarded insurmountable, and I therefore urge my medical friends to divide with the surgeon the responsibility of these cases. I am sure that in this way the opportunity for doing good will be greatly increased. A sufficient number of cases of recovery following operation for perforated typhoid ulcer are now on record to lead to the rational conclusion that the patient subject to this most unfortunate condition had previously not been justly treated. Too often the cry is that the condition of the patient is not good enough for operation. Suppose the surgeon were content to allow this to influence him in the case of internal hemorrhage from other causes, how many lives would be daily sacrificed?

Fortunately, appendicitis occurring as a complication of typhoid fever is not common. Appendicitis occurring in the presence of typhoid fever does not produce symptoms unlike those seen in the disease when it is present as an independent affection. As is usual, a history of a previous attack or attacks can be elicited. The sudden onset of pain referred to the epigastrium or umbilical region, nausea followed by vomiting, which ceases, as a rule, when the pain becomes localized in the right iliac fossa, the circumscribed tenderness which corresponds with the site of the appendix, and

the circumscribed rigidity of the immediately overlying belly-walls will in the greater number of cases suffice to warrant the diagnosis of appendicitis. When appendicitis occurs in connection with typhoid fever the diagnosis cannot always be clear, because of the likelihood of perforation in the latter affection. Experience also teaches that typhoid fever is the cause of chronic appendicitis in a small percentage of cases. The following cases illustrate the statements advanced in the paper:

Appendicitis Complicating Typhoid Fever. N. W., domestic, aged sixteen years, was admitted to the German Hospital May 3, 1897. A history of numerous attacks of colic during past years, often quite severe, was elicited. The patient had been engaged at her usual occupation up to within five days of her admission, when she was compelled to give up on account of indisposition. On the evening previous to her entrance into the hospital she was attacked by severe pain in the epigastric region, associated with vomiting. The pain soon became localized in the right iliac fossa, and was accompanied by circumscribed tenderness and rigidity, corresponding to the usual location of the appendix. Constipation was present. Pulse 100 and temperature 103° F. on the evening of the day of admission. A careful examination of the abdomen showed, in addition to the above-mentioned signs, slight tympany, decided enlargement of the spleen, and the presence of a few rose-colored spots. We were unable to elicit a history of the prodromal symptoms of typhoid fever, and, therefore, concluded, from the indisposition of the patient for five days before admission, the presence of the enlarged spleen, which was not tender to pressure, and the rose-colored spots, that the case was one of typhoid fever complicated by acute appendicitis. Unfortunately, the time was too limited to learn the results of the Widal test.

Operation for the removal of the appendix was advised. This was done on the evening of the day of admission. The usual incision was made. The intestines were distended; the ileum much congested; the appendix was found behind the cæcum, acutely inflamed in the terminal half, and contained pus where it was indurated. Appendix removed; wound closed. Light dressing applied and held in position by strips of adhesive-plaster. The acute pain subsided directly after the operation. Patient transferred to the medical wards under the care of Dr. J. C. Wilson, my colleague, where she received the bath-treatment. Recovery uneventful.

Typhoid Perforation. D. F., aged twenty-seven years, admitted to the German Hospital November 7, 1897. Typhoid fever; perforative ulcer; free pus in abdomen.

Previous History. He had typhoid fever ten years ago, and so belongs to that rather rare class in which a second attack of typhoid occurs.

Present History. Ten days before the patient was brought to hospital he complained of malaise. Had headache one week previous to admission. Bowels were rather constipated. Two nights previous to admission his temperature was 102° F. (only time that temperature was taken by him). On Saturday night (the night previous to admission to hospital) the patient partook of a heavy meal. After eating dinner he attempted to see some patients, when he was suddenly taken with severe abdominal pain, necessitating his going to bed. For this pain he took sulphate of magnesia, applied hot-water bottles to the abdomen, and drank freely of warm drinks. Pain in abdomen was severe, requiring morphia. Sunday morning the entire abdomen was distended, very rigid, and exquisitely tender, especially over lower right quadrant. I was called in consultation by his attending physician, Dr. Eckman. After the examination we were convinced that there was a serious intra-abdominal lesion, probably slow leakage from a perforated typhoid ulcer, as indicated by the history and the condition. We were, however, by no means certain that it was not a perforated appendix. I advised operation, emphasizing the fact that delay would be dangerous. Operation revealed a belly full of pus, with free gas in the abdomen. The appendix was intensely congested and was removed. No attempt was made to locate the perforation, on account of the difficulty experienced in dealing with the intestines, which were greatly distended, so that, notwithstanding the small incision, and the use of gauze packing, etc., it was almost impossible to keep them in the belly-cavity. I therefore contented myself with thorough irrigation and drainage. The case ran a typical course of typhoid of most severe type, complicated by several hemorrhages from the bowel. He was transferred to my medical colleague, Dr. J. C. Wilson, and it gives me pleasure to report the patient's recovery. This case responded to the Widal test.

The pathological examination showed ulceration of the mucous membrane, submucous and muscular coats of the appendix.

The following occurred in the practice of Dr. H. C. Deaver:

Male, aged thirty-five years. Had run a typical course of typhoid fever. At the beginning of the third week he had a sudden, sharp pain accompanied by rigidity of the abdominal muscles, and followed in a short time by marked evidences of peritonitis. The inflammation of the peritoneum localized itself, and the patient slowly improved. Perforation had been diagnosticated, and operation advised and refused. At the end of ten days following the perforation the peritonitis again lit up and became general, the patient promptly dying.

Autopsy showed that there had been a localized peritonitis, with perforation and extravasation of feces at the site of one of Peyer's patches.

Male, aged thirty-six years. Had sudden onset of abdominal pain, accompanied by severe shock and marked rigidity of the abdominal walls, occur-

ring in the third week of the disease. Diagnosis, perforation. Thirty-six hours later the patient was operated upon. The peritoneal cavity contained pus, and a pin-hole perforation was found in the ileum. Death. No autopsy.

Boy, aged nineteen years. Had perforation with typical symptoms occurring in fifth week of the disease. Refused operation. Patient died on the third day following the diagnosis of perforation. No autopsy.

DISCUSSION.

Dr. J. C. Wilson: Dr. Deaver's communication is a most important one. The whole subject of perforative peritonitis, which involves alike the responsibilities of the physician and of the surgeon, is of the deepest interest to every practitioner. The question as to whether or not operation may become necessary must arise in every instance where sudden abdominal pain with collapse and subsequent signs of peritonitis occur. I am not at all sure that we might not formulate a general proposition that such cases should forthwith be operated upon in the vast majority of instances, since in almost all such cases operation gives the patient the almost only chance for life. If, as sometimes happens, these symptoms are followed by gradual recovery, or by the signs of a localized peritonitis, or those of a general peritonitis followed by recovery, the exceptions are so rare that they scarcely militate against the general proposition. The conditions in which perforative peritonitis can occur are manifold. Perforation into the cavity of the abdomen may occur in consequence of necrosis of the containing wall of an empyema, perforation of the gall-bladder, peptic ulcer, gastric or duodenal, as a result of lesions such as have been referred to in the paper, as in enteric fever or appendicitis, rupture of the tube in extra-uterine fœtation, and other conditions such as will occur to all of you. Patients in whom these conditions are present are usually under the care of the physician up to the time of the accident, and it seems to me that it is the duty of the physician to secure with the utmost promptitude the services and co-operation of the surgeon. By prompt operation many lives will be saved. There are, however, cases of perforation in which the question of operation cannot arise—cases in which the patient dies in the course of a few hours in collapse.

Dr. George Erety Shoemaker: It is a surgical axiom that it is inadvisable to operate during shock, and it is an interesting question whether or not the shock of acute perforation should constitute an exception to this general rule. The only exception generally admitted is in the case of acute hemorrhage; for example, in intra-peritoneal hemorrhage the operation should be performed and the bleeding points secured in spite of shock. In the case of acute perforation of the bowel, however, it seems reasonable

to suppose that there is nothing which will prevent a certain amount of reaction occurring in four or five hours; and when primary shock is extreme it would seem better to wait until it has diminished before opening the abdomen. The cases will result in death in a certain number of instances where the previous exhaustion is great, while operation will, no doubt, save life in some other cases. It seems to me that the time has come when we should be ready and willing to subject a perforative typhoid fever case to operation in carefully selected instances.

Dr. Arthur V. Meigs: There is one point which has not been emphasized as it should be, and it is the difficulty of diagnosis. I was on duty at the Pennsylvania Hospital for thirteen years during August, September, and October, the time when typhoid fever is most prevalent, and I used to be struck with the frequency of the discovery, post-mortem, of perforation in cases in which its existence had not been suspected, and, *vice versa*, its absence in those cases in which it was looked for. All those persons who are operated upon and receive no benefit must certainly be injured by the operation—it must produce one effect or the other. I remember an Italian who had a bad attack of typhoid fever, and upon going to the hospital one morning I found the temperature had fallen at once from 105° to 96°. The patient was cold, collapsed, and bathed in sweat, and I thought he had a perforation and would die. The next day he was still alive and in much the same condition. We stimulated him and kept him quiet in bed. On the third day he began to be a little better, and he gradually improved, and was out of danger in a week. The temperature never again went above the normal line. I do not now understand what was the matter with the man, but I am certain that any operation would have ended his life. It is impossible, in such a case, to be certain whether there was perforation. The principal difficulty is the diagnosis, and I am, for my own part, unable to make it with certainty, and those physicians whose practice I have seen have all had the same difficulty.

Dr. James M. Barton: I do not agree with the speaker, that it is advisable to operate in all cases where perforation is known to exist. About twenty-five cases have so far been reported, and all but three or four have perished. This high mortality of over 80 per cent. is probably due to the exhausted condition of the patients before operation.

If it be true that some patients with symptoms of perforation will recover without operation, the operation for closing such perforations in typhoid should be limited to those cases where the patient has fairly recovered or where the attack has been extremely light; in other words, where the patient at the time of the perforation is in exceptionally good condition.

Under these circumstances, with such well-marked sudden pain and collapse that the diagnosis is unmistakable, the operation should certainly be performed.

Preparations for the operation should be made at once, so that the ab-

domen may be opened as soon as reaction has taken place and before peritonitis develops.

Dr. S. Solis-Cohen: There is one point in the title of Dr. Deaver's paper, rather than in the text, which has not been referred to specifically in the discussion, and I shall address my remarks to this only. The title reads "The Necessity of Prompt Surgical Interference in Cases of . . . Appendicitis Complicating Typhoid Fever." If by this is meant, as would seem from the absence of any qualifying term, all cases of appendicitis, decided exception must be taken. If it means perforative appendicitis only, then the subject comes under the same general rules, and especially that of good judgment in the individual case, that apply to any other case of perforation in typhoid fever. All clinicians have learned the frequency of appendicitis complicating typhoid fever, either at the beginning or during its course. We are beginning to look for the development of rose-spots and other symptoms of enteric fever in cases which, at first, present evidences of appendicitis only, and we are expecting in the course of a certain proportion of cases of typhoid fever to find symptoms pointing to catarrhal or other inflammatory, even ulcerative, conditions in the neighborhood of the appendix. Most of these cases get well without interference, medical or surgical. Under good general hygienic management, nature takes care of the patient. Were we to lay down a rule that all cases of enteric fever presenting symptoms of appendicitis should be operated upon, I am sure that the mortality would become much higher than it is or ought to be.

Dr. J. C. Wilson: The cases that recover without operation are so rare that they serve to emphasize the necessity for operation. To see one or two such cases is the experience of a lifetime. With reference to what Dr. Barton has said I must emphasize my belief that a condition of general infection like that of enteric fever does not of itself constitute a contra-indication for an operation otherwise desirable. No surgeon would hesitate to do a tracheotomy at any stage of enteric fever if some condition of the larynx threatening suffocation should arise.

Dr. Deaver: Dr. Wilson has very correctly referred to the limited group of cases which form the exceptions and include those that are moribund, or practically so. The only test I would subject a patient to under these circumstances would be the intravenous transfusion of saline, when, if the improvement in force of circulation which immediately follows the transfusion was permanent, I would go ahead with operation. I believe with Dr. Wilson that every case of perforative peritonitis, with the exception of those that are moribund, should be operated upon.

The question of the inadvisability of operating during shock does not apply to cases of perforative peritonitis to the same extent, by any means, as in many other surgical conditions.

Dr. Meigs is against too hasty operation. The operation done very early in the case of perforative peritonitis cannot be said to have been done too

hastily, and, further, is not attended with the danger which accompanies operation in the presence of purulent peritonitis. Mistake in diagnosis, as we know, causes delay. In a case of typhoid fever, when the patient is suddenly taken with acute abdominal pain, attended by vomiting or not, and with general board-like rigidity of the belly-walls, operation should be done immediately. This subject is so extensive that time will not permit, this evening, to discuss it in detail.

Dr. George Erety Shoemaker showed a specimen illustrating how hemorrhage is sometimes spontaneously arrested in cases of extra-uterine pregnancy, but emphasizing the necessity for operation.

THREE CASES OF ALOPECIA AREATA.

By HENRY W. STELWAGON, M.D.

[Exhibited February 2, 1898.]

Two of the cases were brothers, aged six and eight years, in whom the hair-loss involved the entire scalp, the brows, and to some extent the lashes as well. In the older boy the disease began at the age of three months, following repeated attacks of "spasms." In the younger brother it began as well-defined, rounded patches when one year old, at about the period he was weaned. In both cases there has been from time to time attempts at re-growth, slight downy hair appearing, and this sooner or later falling out again. At present there is an insignificant, almost imperceptible down on the head of the older boy, and slight, scattered, one-fourth to one-half inch long, downy hairs on the younger brother. The general health is excellent in both cases. The mother's hair also fell out when several months old, and she remained practically bald up to the age of four years.

In the third case, a male adult, aged forty-five years, there is at present no hair on the scalp, brows, lashes, beard, and moustache, except a short, insignificant, downy growth. The disease began when thirty-two years old, falling out in spots at first, re-growing to a certain extent, and falling out again. It gradually extended, and finally, for the past several years, has remained in the present condition. The patient has been a great sufferer from asthma, and is of a markedly neurotic temperament. His father, so the patient states, has the same disease and to the same extent, it beginning three years before the disease presented itself in the case before us.

DISCUSSION.

Dr. Milton B. Hartzell: This disease is very interesting from the point of view of causation. There are two theories regarding the cause, one the tropho-neurotic and the other the parasitic. Some maintain that

all cases are due to trouble with innervation; but I do not think this can be proved. In many cases evidences of contagion are present, and some very striking examples of the parasitic nature have been observed in epidemics in institutions for children. In 1892 an epidemic was reported in which there were forty or fifty cases occurring among small children; but no fungus was demonstrable, although the disease spread rapidly from one to another. Another remarkable incident was related by Dr. Crocker, in a family of eight, all of whom presented smooth spots of baldness. After a little while the governess was affected in the same way, as was an adult sister with whom she slept. The point which no one has thought worth while to mention is that, if it is a form of ringworm, it must be due to some fungus different from the ordinary cause of ringworm, as ordinary ringworm almost never occurs in the scalp of the adult.

A considerable number of cases have occurred after injury to nerves or the nervous system, and we must believe that there is a kind due to disturbance of innervation. The French observers are strong in their support of the parasitic theory, and children are excluded from the public schools when they have this disease. They either have a different disease from ours, or theirs is due to a parasitic agent. Dr. Stelwagon very kindly gave me some of the hairs from these cases, which I examined under the microscope, but no fungus was found.

Dr. Stelwagon: It is not very generally understood that this disease is quite common in France, and probably its prevalence has some influence on public opinion, for it forms 3 per cent. of all skin diseases in that country. In England and Scotland it forms from 1½ to 2 per cent., while here it is only half of one per cent. The predominant opinion here is that it is not parasitic and is not contagious. As Dr. Hartzell has stated, children with this disease are excluded from public schools in France, and epidemics are reported among the military.

A STUDY OF RESULTS IN ONE HUNDRED ABDOMINAL OPERATIONS.

By GEORGE ERETY SHOEMAKER, M.D.,
GYNECOLOGIST TO THE METHODIST HOSPITAL AND TO THE PENNSYLVANIA HOSPITAL FOR EPILEPTICS.

[Read February 2, 1898.]

A CIRCULAR letter was recently addressed to a consecutive group of cœliotomy cases of various sorts, asking for information on the following points: Cure, or improvement, of original trouble; return of growth; effect of operation on nervous symptoms (if any had been present), upon pain, upon menstrual function; lastly, as to the development of hernia.

It is hoped that some help can be given, as it has been received, from a consideration of the results of operative treatment, though it is not possible to write down the intricate and wide-reaching elements that have entered into the decision as to the management in each case. An effort is always made to enter into the life-history of the patient and to know the conditions under which she must live. It is always sought to give such treatment as will bring in the end the largest amount of comfort, happiness, and satisfaction to the patient. This means an effort to preserve all the generative functions whenever possible, though this in turn may at times mean failure to secure a complete symptomatic cure. All of the operations except seven were performed at the Methodist Hospital, four were done at the Presbyterian Hospital. Many of them have been reported elsewhere in full.

From the present series, operations for appendicitis are excluded, all of the patients being women with gynecologic disorders. Of the one hundred cases six died (6 per cent.) because, or in spite, of operative interference. They are as follows :

Two cases of hysterectomy for large fibromata weighing fifteen and one-half pounds and seven and one-half pounds respectively, complicated by old peritonitis, extensive adhesions, one[1] with mitral disease, the other[2] with a large pyosalpinx. This class of tumors, late cases, exhausted by hemorrhage and repeated attacks of peritonitis, will always show a large mortality. The third, an extra-uterine fœtation, was septic when first seen. She died eight days after evacuation of several pints of blood, encapsulated by adhesive peritonitis. The rupture of a two-months' fœtation had occurred five weeks before. The blood was surrounded by a wall half an inch or more thick, made up of inflammatory exudate, binding together intestines. This made a mass so nearly resembling a uterus pregnant at term that some physician unknown to me had repeatedly tried to dilate the cervix and deliver a child from the empty uterus. When admitted to the Methodist Hospital the patient was septic and had a bloody discharge from the rectum, into which nature was trying to empty the blood. Immediate flushing and drainage failed to save her. The fourth death followed the removal of ovaries in a case of intraligamentary fibroid tumor of the uterus firmly bound in the pelvis. The patient was single, aged forty-two years, and suffered not only from hemorrhage, but also from extreme flatulent distention, which weeks of treatment preparatory to operation failed to remove. This distention, continuing after the operation of removal of the ovaries, contributed to the intestinal obstruction that caused death. Glass drainage was used, as at that time I was draining more cases than now. This experience was the only one in which I removed ovaries and left the tumor. It is likely to be the last, because the technique of hysterectomy by ligation is now so developed that the reason for the procedure no longer exists, though in the presence of intrapelvic tumors it is advocated by some, including Tait.

The fifth death followed removal in a case of severe double gonorrhœal pyosalpinx, with formidable adhesions of the bowel. The case was flushed and drained by a glass tube. The sixth and last death is instructive, because unexpected. Four of the others

[1] Medical and Surgical Reporter, April 10, 1897, Case II.
[2] American Journal of Obstetrics, February, 1898.

may be ascribed to the fortune of war; the septic extra-uterine, to the late unloading upon the hospital of a case seen to be doing badly at home; but the one now to be reported occurred in a simple case:

X., from Altoona, aged thirty-seven years, had borne one child, and had had two miscarriages. She was ill-nourished, suffering for thirteen years from chronic left salpingitis and sub-involution. The operation consisted in the removal of one diseased ovary and tube, and suspension of the retroverted uterus. It was completed in an unusually short time, and the patient was in a satisfactory condition until the evening, when the pulse rose rapidly, and she died within an hour, with symptoms referable mainly to the heart. Her history included several former attacks of cardiac faintness, but there was no lesion of the valves, and only a somewhat rapid and weak pulse which had not been considered a bar to operation.

Such a death usually means a slipped ligature, but no evidence of hemorrhage could be found. An abdominal section should never be lightly undertaken. There is probably not an experienced operator living who has not lost at some time a simple case. Much can be done by the use of routine rectal enemata of hot beef-tea, and by the free use of salt solution when indicated, to forestall trouble.

In this series, hysterectomy was done nineteen times, or in nearly one-fifth of the cases. Three were malignant, eight were fibromas, one a fibrocyst in an extra-uterine case, seven were for hopeless destructive inflammatory disease of uterus, tubes, and ovaries, usually with persistent hemorrhage near the menopause.

Secondary Hysterectomy in Uncured Cœliotomy Cases. Three cases had hysterectomy done one or more years after a lesser operation had failed to cure entirely. They are of some interest as bearing upon the question as to whether removal of the uterus gives an added element in producing symptomatic cure of chronic pelvic disease.

(*a*) I had removed a diseased appendix and one diseased tube and ovary from a chronic sufferer, a widow, aged thirty-four years. She had previously settled into hopeless nervous invalidism, and was thin, dull of countenance, constantly complaining of her abdomen, but with general hyperæsthesia as well. She had frequent attacks of falling, supposed by her friends to be epileptic, but which were undoubtedly hysterical. Her operative recovery was satisfactory, but she was not restored to usefulness, being

weak and discouraged, exacting constant care from friends and physician. As only one ovary had been removed, she still had dysmenorrhœa, among other symptoms. Her physician, Dr. Braucht, of Milesburg, sent her back to the hospital a year later. Though she constantly complained of the unoperated side, examination was so far negative that I refused to operate at first, declaring her symptoms those of neurasthenia. She was put upon massage, selected diet, and rest in bed, for many weeks, with absolutely no result. She still complained of her abdomen. Finally, almost against my own judgment, I yielded to her own and her physician's desire, and reopened the abdomen. At a single narrow point beneath the scar the small intestine was adherent. The adhesion was released and the other tube and ovary were removed, with the uterus, which was prolapsed. That was nine months ago. Now she is cured, she says so herself. Her physician writes that she has had but one severe nervous attack since, and this had a definite cause.

(*b*) At a first operation the appendix and one tube and ovary were removed. At a second operation, nearly three years later, hysterectomy was performed, with complete and permanent cure. The patient reports herself well eighteen months later.[1]

(*c*) The first operation consisted in double oöphorectomy by a surgeon of one of our large hospitals, which was followed by suppuration. The patient was sent by her physician to me two years later. She was emaciated and suffered constantly from abdominal distress and dysuria. She was feverish and discouraged, and had frequent vomiting. She has not been out of bed for two years. At first I refused to operate, but directed massage and good nursing, and exhausted my resources for many weeks. Little improvement followed, and no relief to the abdominal distress. With much misgiving, although the patient was otherwise a hopelessly bedridden pauper, the abdomen was reopened, numerous adhesions were freed, and the uterus, which was firmly bound against the pelvic wall on the left side, was removed. Operative recovery was excellent. As a late result, there was complete recovery and return to useful life. Her physician, Dr. J. S. Callen, of Shenandoah, writes, "Mrs. S. is a marvel."

While not wishing to advocate removal of the uterus in all cases in which both tubes and ovaries must come out, still observation and comparison of a number of cases, cured and uncured, leads me to the conclusion that the uterus is better removed when itself diseased, if large, heavy, and retroverted, with poor support, when it has been for years the channel of outpour for chronic discharges, when hemorrhage has been excessive from glandular degeneration

[1] Medical and Surgical Reporter, April 10, 1897. Case I. Forty-one Consecutive Peritoneal Operations, with one Death.

of the endometrium. This is especially true in elderly multiparæ. The risks of removal are not great.

Chronic Appendicitis Complicating Other Disorders. In ten cases, although the abdomen was opened for other reasons, the appendix when examined was found either bound down by inflammatory adhesions or its walls were thickened by old inflammation. In two of these instances the appendix was inseparably involved in a large tubo-ovarian abscess. In nine of the cases the appendix was removed as an element in the operation. Death ensued in none. No case is here included in which removal of the appendix was the primary and only operation done. In April, 1896, I read a paper before the Philadelphia Academy of Surgery on the routine removal of the appendix during operations for other causes, when the organ was found on examination not to be normal. Further experience has confirmed the wisdom of the view then advanced. Through the median incision, by which the main operation is done, the appendix can be exposed and removed readily in nearly all cases of the class under consideration. Acute appendicitis, or when a large abscess from rupture of the appendix has been walled off from the general cavity, is not now under consideration. Such cases should be attacked from the side. I would regard the median incision as a serious error when the tubes and ovaries were normal and a pus-collection was about the appendix.

A case of chronic invalidism with pelvic symptoms is often a many sided affair. Nearly all present numerous symptoms of a purely nervous type. Yet behind and beneath these will be found conditions that produce discomfort or pain, and which cause or accompany diseases of the kidney or the intestine. The same case may show lacerations, with retroversion and descent, cystitis, hemorrhoids, salpingitis, and chronic intestinal indigestion or mucous colitis. Nearly all have renal insufficiency and a considerable number have albuminous urine with tube-casts. When cases have chronic catarrhal enteritis the appendix will often be found diseased, and its removal will go far toward curing the gastric and intestinal symptoms. Now such catarrhal conditions of the appendix are often so obscure that they do not alone warrant cœliotomy. It is distinctly urged that opening the abdomen is not

advised for these cases, without a definite diagnosis ; but, when it is opened for other causes, the appendix should always be examined, and if not normal it should be removed.

Relation of Operation to Improvement of Nervous Symptoms. It must be distinctly understood that I am opposed to the removal of normal ovaries for nervous conditions; but by the correction of disease that is a persistent source of irritation, or drain from hemorrhage, nervous conditions can frequently be relieved. It is impossible here to enter into the details of cases or to give a scientific classification of the nervous conditions present, but a report from the point of view of the patients themselves may be suggestive. Thirty-nine cases presenting gross anatomic lesions showed marked nervous disturbance, which ranged in gravity from persistent hypochondriasis, or neurasthenia, through hysteria and hystero-epilepsy, to the general loss of self-control so often described by the patient as being "nervous." In several cases it was my privilege to have a consultation with a neurologist. Seventy-seven per cent. of these cases are cured or markedly improved. One declares that she is more nervous. This case, by the way, did not have both ovaries removed, but should have lost her appendix.

In numbers of cases, marked hysterical or other nervous disturbance proved to be only a surface-play of symptoms, while serious pelvic disease had been one of a chain of causes that had undermined the patient's balance.

For example, a married woman, aged thirty-five years, was found bedridden, with eyelids drooped and quivering, persistent aphonia and poor memory, and weeping upon slight cause. She had general hyperæsthesia, and when able to be out had frequently fallen in the street or at home in hysteroid attacks. She had the peculiar conscious look of hysteria. Her history included a mistaken marriage and great domestic difficulty. Now, it does not take a Nestor in medicine to recognize here a neurotic case; but the man who would have stopped there, attributing the pelvic tenderness to hysterical ovaralgia or hyperæsthesia, would have erred sadly. That woman had enormous double gonorrhœal pyosalpinx, acquired from her husband, with a cyst the size of an

orange attached to the uterus. She had cystitis and œdema of the legs, of renal origin. After careful preparation of the kidneys, tubes, ovaries and uterus were removed. Recovery from the operation was good. For a year or more the struggle with poverty, cystitis and nephritis was a bitter one; but now, while, to use her own expression, she is "not entirely cured," she is very greatly improved. The nervous symptoms are much better. No operation can be expected to right all the wrongs in such a life. Every resource of the physician must be brought to bear in addition. The field of operation is to put the patient on her feet in bodily comfort in many of these cases. The making possible of occupation of mind and body without subsequent distress, will in working-women often bring about a cure, which, among the hopelessly sedentary, would require months of passive exercise, electricity and special feeding. As a cause of profound nervous exhaustion, hemorrhage must not be ignored. Many women with small fibroids bleed from ten to twenty days out of every month. The same is true of chronic hypertrophic glandular endometritis, especially in elderly multiparæ. It is not surprising that with hæmoglobin down to 40 or 50 per cent. they have nervous disturbances. One of my private patients, aged forty-eight years, with many mental peculiarities and much pelvic pain, bled too much for years, and daily for six months, until I removed the uterus with its small fibroid nodules. I showed the specimen in this room several months ago, when its small size was adversely commented upon. But the woman is cured and stays cured after years of suffering. She is vastly better mentally, and, to use her own expression, she is a "new woman."

Hernia in operation-wounds has been reported six times; five in cases in which the through-and-through method of suturing was employed; in four of them drainage was employed. One of them was operated upon while four months pregnant. She went safely through delivery at term, but hernia occurred nineteen months later. This is the only ventral or operation-wound hernia which has been reported since I began to use the buried tier sutures in all undrained cases, now about four years ago. I have elsewhere reported some experiences with umbilical hernia, a

different condition entirely. My method at present involves the separate closure of the peritoneum, muscle, aponeurosis and skin, using intra-cutaneous silk for the skin and chromicised catgut for the aponeurosis and for the muscle. The important feature in all methods is the accurate approximation of the aponeurosis.

Malignant Disease was operated for five times. In two of the cases the disease proved to be disseminated too widely for radical removal, and the operation was abandoned. In one the disease involved the root of the mesentery chiefly, and in the other there was a dendritic growth of the left ovary and broad ligament, with nodules in the omentum.

In three of the cases, with microscopic confirmation, hysterectomy was performed for malignant disease. The patients are living, without recurrence, at twelve months, twenty-two months, and twenty-four months, respectively.

Inflammatory Disease of Tubes and Ovaries, requiring removal, occurred thirty-five times. Extra-uterine pregnancy was present five times, cystic tumors of the ovary seven times ; in one case there was a large dermoid; broad-ligament cysts were present three times; five cases had abdominal tuberculosis.

Uterine suspension was done but once as an independent operation for severe symptoms due to retroversion and descent of the uterus. This patient was cured permanently, and has remained well more than two years, after ten years of suffering. This is not the place for a discussion of uterine suspension as a combined operation in cases, for example, in which salpingitis was operated for, or in which it was one of several procedures required for the cure of uterine procidentia. Suffice it to say that no complications due to the operation have arisen, and the symptomatic results have in the main been satisfactory.

Cases Cured. Different writers will always list differently the cases cured. Immediately after the operation-month I use the word recovery, and wait before applying the word cure until symptoms subside. Only cases of benign tumor can be called cured soon after the patients leave their beds. When one tube or ovary is left behind, and becomes involved a year or more after the patient's recovery, the case is listed as improved. Of the

ninety-four cases that survived operation, forty-nine (59 per cent. of cases heard from) are known to be definitely cured, after a lapse of from six months to two years. Thirty-two are, by a very conservative construction, classed as improved, though fourteen of them are anatomically cured. Many of these are suffering from chronic disorders of other organs, as bladder, kidney, or bowel, and cannot, therefore, be classed as well. Cases of carcinoma are not considered cured until three years have elapsed without recurrence, though they are entirely without symptoms. Among the "improved" are included the six cases of hernia, although the patients were cured of their original disease. Four of the five tuberculous cases were "improved" only, while one, with a large abscess, was cured. Eleven cases could not be found, though probably cured, to judge from similar cases. Only one, a neurotic case, with minor pelvic disease, reports herself as no better. Having one ovary, she still suffers from dysmenorrhœa, etc.

The most satisfactory of all are the large-tumor cases. Next come the chronic pus-cases, of which there were twenty-two, with one death, already noted. Cases that, for non-surgical reasons, have had a doubtful tube and ovary saved are often less satisfactory, as far as comfort goes, though the highest aim of the surgeon has been reached in the preservation of all possible function, with the least sacrifice of tissue. The child-ridden elderly multipara has a right to demand working comfort, with less regard to conservation of function. Many women demand to be unsexed because of their suffering, when it cannot wisely be done. In more than one instance has the restored health following the removal of one side been followed by undesired pregnancy, bringing down wrath upon the surgeon's head.

For pain or neurosis, without lesion, operation is refused. In cases of true epilepsy, whether the attacks are more frequent at the monthly periods or not, it is refused when no pelvic lesion can be found. Though I have, either in general practice or in connection with the Pennsylvania Hospital for Epileptics, seen and examined a considerable number of cases of true epilepsy, no organic lesions having a causal relation have been found. As in all other patients, conditions producing irritation should be cured, if possible, and operations, if called for, should be performed.

On a diagnosis of true epilepsy, or hystero-epilepsy alone, I refuse to make sterile the patient with a normal pelvis, with the object of arresting the attacks, believing that the accumulated evidence shows it to be useless to do so.

No case is refused operation because of inherent difficulty. No malignant cases are refused extirpation if all of the disease can be removed by legitimate surgery. It is not considered to be in the interest of the patient to do a radical operation, such as hysterectomy, if unsound tissue must be left in the broad ligament, bowel, bladder, or lymphatic structures. This means that at least ten cases are seen too late as compared with one seen in time. This unfortunate state of affairs will continue as long as physicians neglect making investigation and wait for symptoms to subside under the plea that the trouble may be due to a disordered menopause, or even a normal one. The climacteric is a most marvellous and inexplicable thing—almost a fetich—in the minds of many physicians and all of the laity. It is made to stretch over twenty or more years, from thirty-five to fifty-five, and almost anything is attributed to it. The cloak known as "malaria" is as nothing beside it. Why wait for the odor of sloughing and signs of hopeless malignancy which the merest tyro could not mistake? I was recently asked to see a young mother with her pelvis solid with carcinoma, with abundant bleeding, but no odor. When I declined to operate, she, already knowing her condition, cried in agony of spirit, "*Why did my doctor never examine me? He gave me medicine for a whole year for bleeding!*" Two weeks after my visit she was dead from hemorrhage. Yet one must be careful of the reputation of a brother practitioner.

As to benign tumors, there are none involving uterus, tubes, and ovaries that cannot, at the present day, be removed with a comparatively low mortality, depending upon the stage at which the case is seen, and upon the skill and experience of the operator in abdominal work, on his surgical judgment, and on the organization of assistants and plant with the aid of which he operates. Very much depends upon good detail work. By the modern steam sterilizer the last excuse for a septic death has been removed. Even the stitch-hole abscess should be the rarest of exceptions and call for rigid explanation.

A CASE OF CYSTICERCUS CELLULOSÆ OF THE BRAIN.

By JAMES HENDRIE LLOYD, A.M., M.D.,
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[Read February 2, 1898.]

THE *cysticercus cellulosæ* is the larval form of the tænia solium, or pork tapeworm. The life-history of this parasite is now well known. The mature form, according to the late Prof. Leidy,[1] is peculiar to man and inhabits the small intestine. It is one of the varieties of the ordinary tapeworm, so familiarly known. The mature links of this worm constitute each a distinct individual or entity, and each is largely composed of a self-impregnating generative apparatus. When ripe, the enlarged uterus, packed with myriads of eggs, fills almost the whole link. In this state the links are cast off in the excrement, and when found they are greedily devoured by the hog. The eggs, when liberated, are probably carried abroad also by the rains into rivulets and ponds. When taken into the stomach of any animal, or of man (for they are not confined to the hog), the links and the coats of the eggs are digested, and the embryo or proscolex is set free. This is formed largely of a head, armed with hooklets, by means of the latter of which it penetrates the intestinal wall, and is carried to the various organs of the host, but especially to the liver and muscles. It is not so common, although by no means unknown, in the central nervous system. In pork this larval stage—or scolex—constitutes the infection known popularly as "measles." When the flesh is eaten uncooked or not sufficiently cooked the scolex, now consist-

[1] Pepper's System of Medicine, vol. ii.

ing of a small cyst with an inverted head, is conveyed into the intestine, where it attaches itself by its head to the mucous membrane and begins forthwith to develop links, and thus becomes an adult tapeworm. Thus the cycle of its life-history is complete.

While man is the usual host of the mature form of the tænia solium, he is only rarely infected with the larvæ. These may occasionally gain admission to his body, however, in various ways. Drinking-water may convey them. They may, possibly, be conveyed by unwashed and uncooked vegetables and fruits that have lain in contaminated water and moist places. They may be conveyed to the mouth by the hands in persons of unclean habits, or a patient may possibly be self-infected by the links or eggs gaining entrance into his stomach from a tapeworm in his own intestines. However acquired, the fact remains that the *cysticercus cellulosæ* is occasionally found in man, and may be the cause of serious inconvenience and even death. This is especially true when it acquires lodgement in the brain. It then causes a train of symptoms that may be of most obscure significance. In this respect its lodging place is of the utmost importance. Thus, in the muscles a small number of "measles" may not be of serious import, but in the ventricles of the brain a few even of these cysts are very likely to kill.

A word in passing may be said about another and much worse variety of tapeworm larvæ—the echinococcus or hydatid. This latter is a compound cyst—*i. e.*, it develops a large number of heads from a single cyst. Hence the formidable mutilocular hydatid tumor, which, fortunately, is rare in man in this country. It is almost invariably fatal, not only in the brain, but in the liver and other organs, unless the patient can be relieved by surgical interference.

As it is not the object in this paper to discuss elaborately the natural history of the tapeworms, but merely to indicate the clinical significance of the cysticercus when lodged in the brain, I shall pass to a consideration of this subject and a brief description of a case.

This parasite, when lodged in the brain, can undergo an enormous hypertrophy. Thus, from being a small cyst, the size of a

millet-seed, as seen usually in the muscles, it may become as large as a grape, or even a walnut—perhaps even larger. This hypertrophy is probably not a healthful development, but the evidence of degeneration and sterility. Some cysts do in fact evidently deteriorate; they become opaque and filled with a yellowish or milky fluid, and acquire thickened walls. As each cyst represents only one head, it is not always easy to find hooklets, which are few in number, in this respect differing from the hydatid or compound cysts, which develop many heads from a single cyst by a process of budding. The cysticerci may be found in the substance of the brain, or beneath the membranes, or floating free in the ventricles. They are sometimes grouped like a bunch of grapes, or they may be entirely free, or, as in my case, some may be in bunches, some free, and some adherent to the ependyma. There is generally a great increase of the ventricular fluid in cases in which the cysts are in the ventricles, and the irritation of their presence is shown by a distinct ependymitis, with various deformities of the walls of the ventricles and of the foramina and contiguous structures. In my case this was especially so in the aqueduct of Sylvius.

Frederick B., a white man, aged thirty-four years, and a native of Pennsylvania, was admitted to the Philadelphia Hospital on June 12, 1897, suffering with rather obscure symptoms, which indicated some cerebral affection. He had severe and constant headache, loss of memory, and a rather sluggish mental state. He had apparently no control over his rectum, and he said in the receiving-ward that his bowels had moved three times while he was coming to the hospital, but that he had had no knowledge of the movements at the time they occurred. He gave a history of a sunstroke three years previously—after which he had been dull and even semi-conscious for several weeks. He had had several attacks of semi-consciousness since that time, the last one about one year before, at which time he had been in the hospital, and had been thought to have syphilis of the brain. He was very stupid during these attacks, and his mother reported that in one of them she had been unable to get him to speak for five days, during which time he took but little food, and had no control over his bladder and rectum. This attack came on suddenly. He fell on the street, and was carried home.

Since the initial attack—thought to be due to sunstroke—the man had had severe and more or less constant headache, which was increased by motion or jar, upon which he would seize his head and cry out with pain; sometimes he would be dazed for a moment. He always said that he felt

something like a ball rolling from the front part to the back of his head. He expressed the wish to have his head opened and the cause of the trouble removed. There was no history of alcohol or syphilis.

After admission the chief complaint continued to be headache. The patient had a slight hemiparesis of the left side (arm and leg), and his tongue protruded to the left. One of the notable symptoms was well-marked ataxia, more marked on the left side. Station was poor, but the knee-jerks were exaggerated and ankle-clonus was present. The man had control of the bladder, but not of the rectum. He had impaired power of attention and loss of memory, so that he could not keep the days of the week. Drowsiness and intense headache were nearly constant. Speech was slurring. Vision had been failing for some time.

As the case progressed, the stuporous condition, with intense headache, continued. There was loss of control of the bladder and rectum. The patient would fall asleep while eating. It became difficult to feed him, and his jaws had to be forcibly separated in order to do so, in consequence of a slight trismus. On pressure, the skin paled, and then flushed and remained so for some minutes. There were no epileptic attacks. The urine remained normal. There was no optic atrophy or neuritis.

Toward the end profound coma set in, and there was some œdema of the lungs. In this condition the patient died, about one month after admission to the hospital.

At the autopsy nothing abnormal that was noteworthy was discovered in the man's body, except in the brain. The findings there were as follows: The arteries at the base and the membranes everywhere were normal. Both ventricles were distended, the right much more than the left. This right ventricle bulged beneath the corpus callosum and extended far across the median line. Thus, before it was opened, it presented a marked appearance of unilateral hydrocephalus. When it was opened, by incising the corpus callosum close to the brain-hemisphere, there appeared at the opening, and tending to float out with the escaping cerebro-spinal fluid, numerous free cysts of various sizes. These cysts were translucent, smooth and satin-like, and filled with clear, watery fluid. They did not rupture on escaping. The largest was the size of a walnut—3.5 cm. in diameter—and the others varied from this to the size of a small pea or even a duck-shot. Many of them were about the size of a grape. They were eighteen in number. They floated very freely in the fluid of the ventricle, moving through this on the slightest touch or motion, the smaller ones sinking out of sight in the several horns of the ventricle. Some of these cysts were in appearance clustered together about a larger one, somewhat like a bunch of grapes. These could not be separated without tearing and rupturing their walls. The central cyst of the bunch was yellowish and opaque, as though it contained a semi-fluid, cheesy material. The remaining cysts were separate. The ependyma over the caudate nucleus was thickened and roughened, as though it had been the seat of inflamma-

tory changes, and this had evidently been the case. The third ventricle was the seat of considerable change. Its opposing walls were thickened and in some places agglutinated to each other. The middle or gray commissure was thickened and tougher than usual, and did not tear apart. Thus, the cavity of this ventricle was partly obliterated, but it contained no cyst at the time of the autopsy. The aqueduct of Sylvius was closed at its entrance into the fourth ventricle, and was divided into two canals (each of them a cul-de-sac) by a septum which was doubtless of inflammatory origin. One small cyst was found in the lower part of the fourth ventricle. It was adherent to the floor, and was about 0.5 cm. in diameter. This was the only cyst of all that was adherent. There were no cysts in the left ventricle and none in the substance of the brain, nor beneath the membranes anywhere. No tapeworm was found in the intestines, nor were there any cysticerci in other organs of the body, or in the muscles, so far as a rather careful search could determine.

In commenting upon the data for a successful diagnosis in such a case as this, it may be said that nothing in the clinical picture was absolutely indicative of the presence of cysticerci. The case bore a general vague resemblance to some cases of brain-tumor, but symptoms for localizing the lesion were wanting. It resembled brain-syphilis not a little, although a history of syphilis was not obtained. The history of a probable sunstroke some years before suggested the possibility of a meningitis due to this cause. During life the case remained obscure, and a successful diagnosis was not made. Considering the rarity of such cases in this country, and the absence of characterizing symptoms, this can scarcely be wondered at.

In analyzing the symptoms we may note especially persistent headache. This was the most urgent symptom, and strongly suggested the presence of an intracranial neoplasm. Observers of cysticerci in the hog state that the animal may be infested with numerous cysts in the brain, and yet show no distinct sign of them. Of course, pains in the head cannot be estimated in the lower animals.

The slight hemiparesis can be accounted for by the extreme distention of the lateral ventricle, which must have caused some pressure on the internal capsule, especially about its junction with the corpus callosum.

The sense of an object rolling in the head was strongly insisted

on by this patient. The free mobility of the cysts in the fluid of the ventricle on every movement of the head may have caused such a subjective symptom. The group of eighteen cysts made a good-sized handful; hence, they were of sufficient bulk to have caused some disturbance as they floated about and knocked against the sides of the ventricle. I have not seen this symptom noted by any other observer.

Ataxia has been observed in cases of cysticercus of the brain. In my case it was well marked. Its mechanism is not altogether plain. The cerebellum was not involved; the small cyst in the fourth ventricle was adherent to the post-oblongata, and was so small that it could hardly have interfered with the cerebellum.

The clustering occasionally of the cysts of the cysticercus in a bunch—like a bunch of grapes—has given rise to a new term—*cysticercus racemosus*. Zenker[1] has recognized several varieties of this form, but his distinctions are purely artificial. The true nature of these cysts is indicated by their structure, which is that of *cysticercus cellulosæ*, but the observation of the head is indispensable in order to insure the diagnosis. This is made from the hooklets. In this bunched variety the head is difficult to find, as it may develop on a shrunken portion instead of on a dilated and more healthful part. In many cases the head develops incompletely, its hooklets being few in number and imperfect in form. The more this racemose form departs from the normal type the more it has a tendency toward sterility. The racemose variety, moreover, is probably only an accident, due to the original cyst having undergone various constrictions and dilatations. It is found especially in the brain, and the remarkable form it affects is due to this: that the absence of a capsule permits the cyst to elongate and adapt itself to the various sinuosities and detours of the cavity, and this leads to the formation of bands and adhesions, which divide one portion from the other. According to this view, a bunch of cysts represents really only one cysticercus, and has but one head and one set of hooklets. Hence the importance of not confusing this variety with true compound cysts, with innumerable heads, such as the true hydatids.

[1] Blanchard: "Traité de Zoologie Médicale," pp. 389–440.

In my case two large hooks were found by Dr. L. N. Boston, resident physician, who took great pains in studying the specimens. At the Bureau of Animal Industry in Washington, to which a few cysts were sent, they were determined to be those of *cysticercus cellulosæ*.

DISCUSSION.

Dr. F. P. Henry: There is one practical point that has been overlooked. It is stated that the only cysticercus thus far found in the brain is that of the tænia solium, which is easily recognized by the row of hooklets encircling the rostellum. The tænia most prevalent in this country is the beef-tapeworm, the tænia saginata. It is, therefore, a matter of importance in every case of tapeworm to make a diagnosis of the variety present, and this may be readily done by a careful inspection, both gross and microscopic, of the segments passed per rectum. Suppose, for example, that a patient, the host of a tapeworm, presents symptoms referable to the brain. If a study of the segments of the worm shows that it belongs to another variety than the tænia solium, the physician may conclude, with reasonable certainty, that the brain symptoms are not caused by the cysticercus cellulosæ.

I am inclined to take exception to the view advanced by Dr. Lloyd as to the manner in which the cysticercus gains access to the brain. I understood him to say that it might be the result of its ingestion. This is contrary to what we know of the life-history of tænia. The eggs of the tænia, being discharged per rectum, reach the cysticercus stage in another animal, such as the cow or pig, and this cysticercus, being ingested by man, develops into a mature tænia. The mode in which the cysticercus reaches the tissues of man is believed to be by self-infection, which is the result of the act of vomiting. A patient who harbors a tænia solium in his intestine is seized with an attack of vomiting; some of the detached segments of the worm are forced into the stomach, and are there digested. The eggs, being liberated by the action of the gastric juice, develop into the larval cysticercus stage, and, in some unknown manner, gain access to the various organs and tissues of the body.

A word in conclusion, with reference to the nomenclature of this parasite. The term "tænia solium" is not only ungrammatical, but meaningless, and the term cysticercus cellulosæ is not much better. The word *cellulosæ* is an adjective agreeing with "telæ" understood, the word *tela* meaning a web or tissue; so that the complete term should be "cysticercus telæ cellulosæ"—*i. e.*, cysticercus of the cellular tissue. This, however, is incorrect, since the cysticercus has no special predilection for the cellular tissue.

A CONSIDERATION OF THE REAL VALUE OF THE BRAND BATH IN TYPHOID FEVER.

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[Read March 2, 1898.]

As its title indicates, the object of this paper is to discuss the real value of the cold-bath treatment of typhoid fever by a study of the statistics and facts which are now before the profession concerning it. It is sometimes wise when a plan of treatment seems to be particularly effective to analyze its results to determine its real value, for, as Cabot has well said recently in a paper on the routine use of alcohol in fevers, the progress of therapeutics is seriously hindered by the fact that every case is given the best treatment known, and so we are satisfied with it. We desire to state at the outset that we fully recognize the great usefulness of the cold bath of Brand, although it may seem in the course of our paper that we are attempting to cast discredit upon it. On the contrary, we desire first to determine its actual value, and second to inquire whether its routine use is wise.

When the physician begins to study this subject he is met by the statement that the mortality, which was at one time no less than 25 per cent., can be reduced by the cold bath to from 10 to 7 per cent. As a matter of fact, a mortality of 25 per cent. has not been commonly met with for many years, and the largest body of

statistics yet collected giving this death-rate are those made in Germany and France many years ago, when the disease was particularly virulent, when only severe cases were recognized and classified, and further, when, owing to what may be called barbarous treatment, the patients who survived fought their way against infection and treatment. Further, hospital facilities were comparatively poor, nursing ineffective, and sanitation wretched.

That severe cases chiefly entered into these statistics is proved by the statements of Griesinger and Strümpell, who point out that numerous light and rudimentary attacks (typhus levissimus) were not recognized till lately as belonging to typhoid fever at all.

That the treatment was calculated to increase the mortality is shown by Vogl's statement, that it consisted in venesection, emesis and catharsis, and free use of mercury. That the hospital facilities were wretched in many instances as compared to those of to-day is notorious (see Baas, *History of Medicine*), and the history of individual cases and the results of analysis of large bodies of statistics impress upon us the important fact that among the poor who have not hospital care, and in armies where the patients are not cared for when in the field as is possible when at home, the death-rate is very high and the signs of disease severe.

Improvement in sanitation has decreased the frequency and mortality of this disease remarkably, as is shown by statistics.

Mosny has shown that the death-rate of Vienna decreased from 12.05 per 10,000 to 1.1 after a pure water-supply. In Dantzic the mortality has fallen from 10 per 10,000 to 2.4, and finally to 1.5 per 10,000. In Stockholm it has fallen from 5.1 in 1877 to 1.7 in 1887. So, too, in Boston from 17.4 in 1846–49 to 5.6 in 1870–84.

The following table is of interest in this connection:

MORTALITY IN MUNICH FROM 1851 TO 1896.

(This table is taken from Pettenkofer's "Munich a Healthy City," up to 1887 inclusive; after 1887 from returns obtained from the Statistical Bureau.)

Year.	Inhabitants.	Annual.	Per 100,000 inhabitants.
1851	123,957	123	99.0
1852	125,588	152	121.0
1853	127,219	235	184.0

Year.	Inhabitants.	Annual.	Per 100,000 inhabitants.
1854	128,850	293	227.0
1855	130,481	253	193.0
1856	132,112	384	291.0
1857	133,847	390	291.0
1858	135,733	453	334.0
1859	137,005	240	175.0
1860	140,624	153	109.0
1861	144,334	172	119.0
1862	148,200	300	202.0
1863	154,602	252	163.0
1864	160,828	397	247.0
1865	167,054	338	202.0
1866	168,265	342	203.0
1867	169,476	88	52.0
1868	170,688	136	80.0
1869	170,000	190	111.0
1870	170,000	254	149.0
1871	170,000	220	129.0
1872	169,693	407	240.0
1873	175,500	230	131.1
1874	181,300	289	159.0
1875	187,200	227	121.0
1876	193,024	130	67.0
1877	205,000	173	84.0
1878	211,300	116	55.0
1879	217,400	236	109 0
1880	223,700	160	72.0
1881	230,028	41	18.0
1882	236,400	42	18.0
1883	242,800	45	19.0
1884	249,200	34	14.0
1885	255,600	45	18.0
1886	262,000	55	21.0
1887	268,400	28	10.0
1888	292,800	31	10.5
1889	306,000	31	10.1
1890	331,000	28	8.5
1891	357,000	24	6.4
1892	372,000	11	3.0
1893	385,000	57	14.8
1894	393,000	10	2.5
1895	400,000	15	3.7
1896	412,000	14	3.4

The effect of improved sanitation is to decrease the virulency of infection, and for this reason there follows a decreased severity of illness and a decreased percentage of mortality.

For these reasons, then, we shall exclude the statistics of 1840, 1850, and 1860 from comparison, and confine ourselves to more recent statistics more suitable for this purpose. This is the more important when we discover that the frequency, severity, and mortality of typhoid fever are steadily decreasing all over the world, as is shown by the following interesting tables of Dreschfeld in regard to England in general and London and Manchester in particular:

ANNUAL MORTALITY, PER MILLION PERSONS LIVING, FROM FEVER IN ENGLAND.

Period.	Enteric cases.	Period.	Enteric cases.
1838	1228	1866	986
1839	1010	1867	778
1840	1089	1868	895
1841	932	1869	390
1842	1004	1870	388
1843	....	1871	371
1844	....	1872	377
1845	....	1873	376
1846	....	1874	374
1847	1807	1875	371
1848	1266	1876	309
1849	1044	1877	279
1850	865	1878	306
1851	997	1879	231
1852	1022	1880	261
1853	1008	1881	212
1854	1015	1882	229
1855	875	1883	228
1856	847	1884	236
1857	988	1885	175
1858	918	1886	184
1859	806	1887	185
1860	652	1888	172
1861	767	1889	176
1862	919	1890	179
1863	874	1891	168
1864	960	1892	137
1865	1089		

DEATH-RATE FROM ENTERIC FEVER IN LONDON AND MANCHESTER PER 1,000,000.

Year.	London.	Manchester.	Year.	London.	Manchester.
1871	267	450	1883	247	200
1872	242	400	1884	234	190
1873	269	460	1885	150	170
1874	256	390	1886	154	290
1875	235	440	1887	151	310
1876	217	420	1888	169	330
1877	251	290	1889	130	310
1878	283	310	1890	146	270
1879	229	180	1891	132	370
1880	186	260	1892	102	240
1881	254	170	1893	161	250
1882	252	250			

Not only is the decrease in mortality seen in England, but in Philadelphia and New York, as follows:

PHILADELPHIA.[1]

Year.	Cases.	Deaths.	Per cent. of mortality.
1888	3573	785	21.9
1889	4631	736	15.8
1890	3182	566	20 9
1891	3531	683	19.3
1892	2304	440	19.1
1893	2519	456	18.1
1894	2357	370	15.7
1895	2748	469	17.0
1896	2490	402	16.1
1897	2994	401	13.3

NEW YORK.

Year.	Cases.	Deaths.
1888	1108	364
1889	1414	397
1890	1100	352
1891	1342	384
1892	1140	400
1893	1008	381
1894	792	326
1895	965	322
1896	1002	207
1897	1004	299

[1] These statistics go back as far as the comparative records extend.

The decrease in cases and in mortality is shown in the following chart in broken and complete lines (Chart I.):

CHART I.—SHOWING DECREASING NUMBER OF CASES AND DECREASING PERCENTAGE OF MORTALITY OF THESE CASES IN PHILADELPHIA.

(Broken lines represent mortality per cent.)

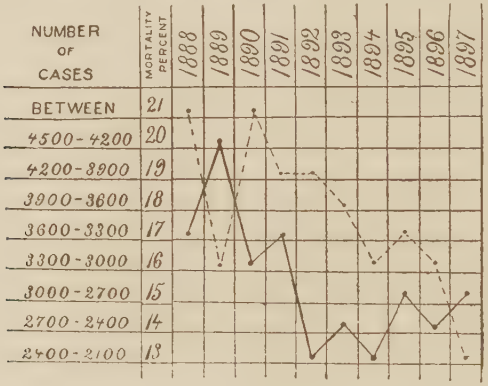
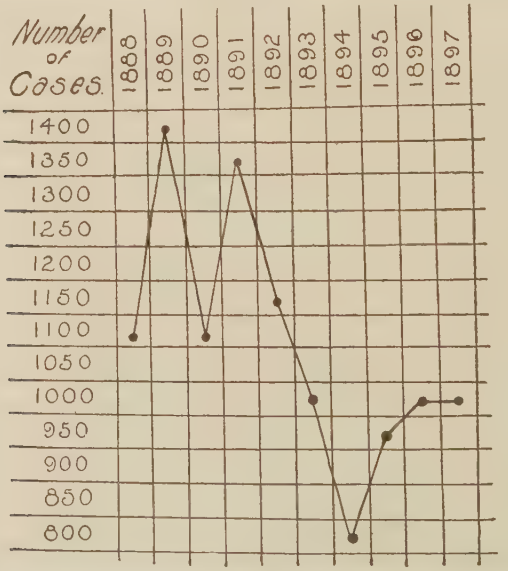


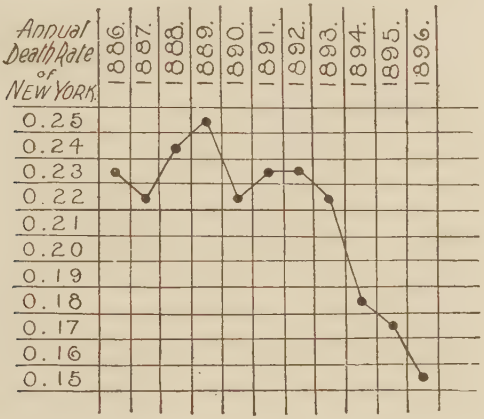
CHART II.—SHOWING DECREASING NUMBER OF CASES ANNUALLY IN NEW YORK.[1]



[1] A comparative chart of the number of cases and of mortality per cent. from these figures is not given, as Dr. Biggs, of the New York Health Office, writes that only recently have the cases been generally reported, and even now many are not reported.

The following chart from the New York Health Report shows a decreasing death-rate from typhoid fever (Chart III.):

CHART III.—SHOWING DECREASING DEATH-RATE FROM TYPHOID IN NEW YORK CITY.



When we consider that the population of these cities has increased enormously, the great decrease in the disease is very notable.

These tables are supported by the statement of Billings that in Norway from 1888 to 1891 the mortality from typhoid fever was 755 in 7467 cases, or less than 10 per cent. In the present Maidstone epidemic the death-rate in 1885 cases is only 7.5 per cent., and a similar mortality obtained at Plymouth, Pa. Again, in the *Gazette Médicale des Hôpitaux* of July 10, 1890, we learn that a collective investigation showed that, whereas in the period from 1866 to 1881 the mortality from typhoid was 21.5 per cent., from 1882 to 1888 it was 14.1 per cent.; in 1889, 13.5 per cent.

It is evident, therefore, that the mortality to-day should be placed at less than 15 per cent. as a fair percentage, the more so as many years ago Murchison placed it at 17.45 among 27,951 cases in England.

Assuming, then, that the ordinary mortality of typhoid fever is at present about 15 per cent., the question arises, How much credit is to be given to the cold bath method for the reduction claimed by its advocates to be about 7 or 8 per cent.? It is well in this

connection for us to remember that a disease that cannot be aborted, and which runs a definite course till it is completed, will do less damage to the patient if the case is guided through the storm so that his natural processes are not perverted than if, by meddlesome or absolutely harmful treatment, his organs, already bearing the burden of disease, are still further strained by the influence of unnecessary drugs and by the necessity of absorbing and eliminating them.

The best treatment for typhoid fever is to let drugs alone so far as possible. It is evident, therefore, that if a given routine is followed which is manifestly not incorrect in its fundamental details, better results will be obtained than if each physician steers his patient on a course of his own choosing, which may be not only useless but actually dangerous.

This is shown by the facts presented by Liebermeister in his well-known article in Ziemssen's *Cyclopædia*, in which he gives carefully prepared tables of 839 cases, of which 377 were treated non-specifically, with a mortality of 18.3 per cent.; 223 treated by full doses of calomel, with a mortality of 11.7 per cent.; and 239 with iodine, with a mortality of 14.6 per cent. If the grave cases are included in his statistics the mortality of a general plan of treatment was 25.3, those treated with calomel 16.3, and with iodine 17.2 per cent. A routine treatment here gave a saving of life nearly as great as the cold-bath treatment often does, the difference between 15 and 7 per cent. Liebermeister adds that he has compared fifty cases treated with calomel, fifty with iodine, and fifty by general indefinite measures, selecting those admitted about the same time, and all of whom were looked upon as grave cases in their early history. All the calomel cases recovered, and yet he rejected all cases which did not reach an axillary temperature of 104° F. or over.

Bouchard, with intestinal antisepsis, quinine, cool bathing, etc., had a mortality of 11.16 per cent. as against 21 per cent. on the old general plan of treatment; while Mason records 676 cases with a mortality of 10 per cent. under cool sponging, intestinal antisepsis in some instances, and symptomatic treatment. Under a similar plan Jaccoud lost out of 655 cases 10.8 per cent. Riess

in 900 cases, with the use of tepid baths, had a mortality of 7 to 8 per cent., and under pure expectant treatment, with plenty of water to drink, Debove had at the Hôpital Andral 9.2 per cent. (See also Collie's statistics, about to be quoted.)

Of very great interest in this connection are the results recorded by A. L. Mason in the *Boston Medical and Surgical Journal* of April 14, 1892. During 1890–91 there were treated in the Boston City Hospital 676 cases of typhoid fever, of which seventy-five were fatal, or 10.4 per cent. This includes all cases—mild, moribund, or doubtful—which entered the house. To illustrate how statistics may mislead, Mason records five different series of cases aggregating 242 cases with five deaths, or a mortality of about 2 per cent. The treatment consisted not in the Brand method, but in sponging and affusions, the use of antipyretic drugs, antiseptics, and tonics.

The following contains a large number of cases treated without baths:

	Cases.	Per ct. of mortality.	Treatment.
Basel (Liebermeister)	223	11.7	Calomel.
Basel (Liebermeister)	239	14.6	Iodine.
Maidstone, England	1,885	7.5	General.
Boston (Mason)	676	10.4	General.
Homerton (Collie)	677	9.5	General.
Glasgow (Collie)	618	8.2	General.
Société Médicale des Hôpitaux (1879)[1]	1,979	12.47	
Jaccoud	665	10.8	General.
Riess	900	7.5	Tepid baths.
Boston (Shattuck)	237	9.8	Expectantly and cold sponging.
Germany (?) Brand has collected	19,017	7.8	All kinds of cold baths.
	27,116	10.02	

In other words, 27,116 cases in Switzerland, America, England, Germany, and France show that good nursing and careful non-meddlesome treatment will give a mortality of about 10 per cent. It

[1] These statistics are based upon the fact that twenty-one chiefs of hospital service reported to the Société Médicale des Hôpitaux (1890) 916 cases with 114 deaths, or 12.44 per cent., under general treatment; and for 1888 and 1889 this report also mentions 1063 cases so treated, with 133 deaths, or 12.51 per cent.

may be argued that these cases cannot be compared with cold-bath methods, but the wide distribution of the cases and the large number of clinicians certainly give us what may be called a standard average. The reduction in mortality to 10 per cent. is, therefore, due to good nursing and treatment, and the further reduction to 7.5 per cent. claimed by Brand advocates only amounts to 2.5 per cent.

Admitting, then, that a harmless form of treatment with careful nursing naturally modifies typhoid fever, these factors must be deducted from the credit given to the cold bath of Brand (which gives 7.5 per cent.) before we can reach real facts as to the value of this plan *per se*, for in it careful nursing is a *sine qua non* to its use, and only such medication is resorted to as is needed to control symptoms or accidents. Again, one other factor is not to be ignored, namely, that it is an almost universal practice to use alcohol in the cold-bath treatment, and this stimulation, often repeated many times a day, by means of a drug which lends force to the system, is to be credited with some effect. To emphasize still more the fact that good nursing and treatment modify the mortality without the bath, we can quote the figures of Collie comparing the death-rate in Basel with that elsewhere in the same years with and without the bath.

TABLE SHOWING MORTALITY UNDER GENERAL TREATMENT TO BE LESS THAN UNDER BATH TREATMENT.

	No. of cases.	Treatment.	Mortality per ct.
Basel (1873) . . .	163	Bath.	10.4
Glasgow (1873) . . .	275	General.	9.4
Homerton (1873) . .	305	General.	9.5
Basel (1874) . . .	200	Bath.	10.5
Glasgow (1874) . . .	343	General.	7.0
Homerton (1874) . .	372	General.	9.6

At Basel in 1873, under the cold bath, there were 163 cases, with a mortality of 10.4 per cent.; during the same year at Glasgow without baths 275 cases, with a mortality of 9.4 per cent., and 305 at Homerton, with a mortality of 9.5 per cent. In 1874 at Basel the water cases were 200, with a mortality of 10.5 per cent.; at Homerton 372, with a mortality of 9.6 per cent.; at

Glasgow 343, with a mortality of 7 per cent. As Collie well points out, it is likely that the cases in Glasgow, with 500,000 population, and East London with 1,000,000, would be more severe than in Basel, a country town of 40,000 to 50,000 people.

Before determining the value of a method of treatment from statistics derived from hospital practice, it is necessary to ascertain the death-rate outside of that hospital, and if possible for the entire city or surrounding country.

In this connection it is interesting to note that in Dr. J. C. Wilson's cases, recorded with great detail to the number of 108 as occurring in the German Hospital from June 1, 1893, to October 1, 1894, and submitting to the most rigid type of bath treatment, the mortality reached 11.1 per cent., and that for the same two years 1893–94 the mortality in the whole city of Philadelphia, including every type of case and every plan of treatment, or none at all, was only 16.8, or in other words, the mortality of the bath treatment was only 5.7 per cent. less than that of the whole town. Again, in the series of cases which he has had since that time (October 1, 1894, to January 1, 1896), namely 117, he had nineteen deaths, or a mortality of 16.25 per cent., whereas for the whole city of Philadelphia the mortality was only about 15.3 per cent. Allowing for the fact that Dr. Wilson excluded from his cases patients who were admitted moribund, and that all of them were under the most approved and complete nursing and in the hands of competent resident physicians and a physician-in-chief of wide experience, it does not seem to us that the bath treatment has really given in this instance a very great degree of life-saving; and it must be recalled that while the percentage of deaths named by Dr. Wilson was a percentage derived from all (with the exceptions noted) cases in the wards, the percentage of mortality for the city was really far less than it would seem, for many physicians neglect to report cases unless they grow so ill that it is done at once before the death certificate has to be signed.

Considering the fact that patients are supposed to be greatly benefited by this treatment, if treated before the fifth day, it is a curious fact that out of fourteen of Dr. Wilson's cases (in 108) which received the bath by the fifth day, no less than four died,

and another case died which is stated as admitted early in the disease. It is also an interesting fact that, while the general mortality of Philadelphia was decreasing progressively in 1890, 1891, 1892, 1893, and 1894 from 20.3 to 15.7 per cent., Dr. Wilson's statistics should have an increasing mortality from 1.8 in 1890 to 11.1 per cent. in 1894, and 16.25 in 1894 to 1896. Owing to imperfect health reports we cannot discover the percentage of typhoid mortality in Baltimore to compare with Osler's cases.

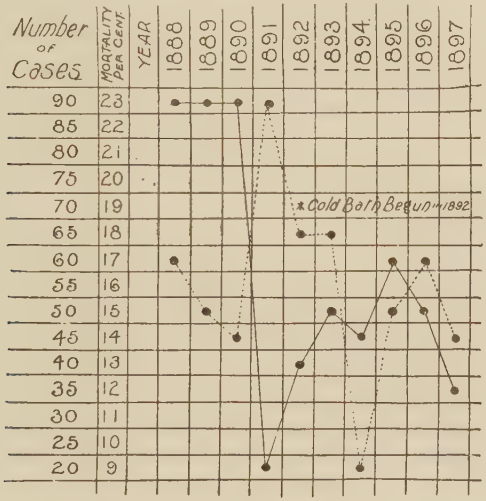
The same difficulty exists in New York in regard to Gilman Thompson's and the city statistics. At the Philadelphia Hospital, for the ten years from 1888 to 1897 inclusive, the number of cases of typhoid fever and the mortality percentage are shown in Chart IV. The practice of tubbing was not instituted till 1892. How rigidly it has been enforced we have not been able to determine, but it is evident that the mortality has not been materially influenced by this means. Thus, 1888, 1889, and 1890 had a mortality without the bath identical with that after the bath was used in 1895, 1896, 1897; and 1888, 1889, and 1890 had a mortality lower than 1892 and 1893, when the bath was used. We think, therefore, that it may be considered proved that a large credit should be given to other causes than the Brand bath, and this holds true not only for this country but abroad, for most of Brand's statistics are derived from German military hospitals in times of peace, when everything tends to a mild course of the disease. The military sanitation, the close watch over each individual, the fact that a livelihood is not lost if the patient goes to bed early, all tend to render the disease mild and to cause cases to come under treatment early. Further, the patients are in the great majority of cases very young, just passing out of their teens. It is evident, therefore, that the cold bath in itself is not as useful as would appear at first sight.

There are certain objections to the cold bath in the sense of tubbing which must be met. The first of these is that by their use an unnecessary expenditure of the patient's strength ensues. No one can see for the first time a typhoid fever patient bathed without a feeling of mingled pity for the case and mistrust for the method. To use Osler's clever words : " When I hear a poor

fellow (who has been dumped, like Falstaff, ' hissing hot ' into a cool tub) chattering out maledictions upon nurses and doctors, I am inclined to resent it, and to pray for a method which may be, while equally life-saving, to put it mildly, less disagreeable." So much for sentiment and perhaps judgment. Let us see if there are other rational objections.

CHART IV.—SHOWING MORBIDITY AND MORTALITY PER CENT. AT THE PHILADELPHIA HOSPITAL FOR TEN YEARS, 1888 TO 1897 INCLUSIVE.

Solid line, morbidity; dotted line, mortality per cent.



To remove a patient too feeble to raise his hand to his head, into a tub of water some 35° F. colder than his body, which is accustomed to the heat of his bed, seems heroic, and the lifting and necessary handling must produce some loss of needed strength. Again, the shock of sudden and complete immersion may or may not be harmful, according to opinion, but the nervous awakening, if really a good thing, can hardly be looked upon without the thought that the nervous energy expended is unnecessarily great, and one wonders whether the same results for good could not be obtained by gentler measures. That they cannot remains to be proved. When it comes to permitting a patient to rise from his bed and step into the tub, then we believe the enthusiasm of the

bath advocate oversteps the limits of good sense. Nothing can possibly be gained by this expenditure of strength and its strain on a heart taxed by fever, exhaustion, and toxæmia. Even if strong enough at the time, the patient should save such energy for some future crisis or to aid in his convalescence. If walking typhoid has a high mortality it is due to this lack of conservation of energy. It seems to us as unwise for a patient to arise and step into a tub with a possibly ulcerated artery in a Peyer's patch as for a case of aneurism to make any effort. The shock and altered circulation are sufficient strain on the bloodvessel without the additional strain of change of posture and of effort.

Thus Liebermeister says, although an ardent bath advocate: "It is possible that the determination of blood to the internal organs, caused by the abstraction of heat, may increase the *tendency to hemorrhage; and at all events the moving of the body, be it active or passive, connected with the taking of a bath, is injurious.* The same thing, of course, holds true, to a still greater degree, in perforation of the bowels."

Hemorrhages. The frequency with which hemorrhages occur varies greatly in different epidemics, independent of any specific line of treatment over and above rest in bed. Lack of such rest certainly predisposes the patient to this accident. In 861 cases of this disease without the cold bath in Liebermeister's clinic at Basel, hemorrhages occurred seventy-two times, or in 8.4 per cent. Griesinger met with thirty-two cases in 600, or in 5.3 per cent.; and Louis found them in 5.9 per cent., excluding mild cases. The younger Wunderlich has recorded ninety-eight cases of typhoid fever without the bath with hemorrhage in two cases, or about two per cent. We find, therefore, that in 1559 cases treated without the cold bath there were ninety-nine hemorrhage cases, or 5.2 per cent.

On the other hand we find that in bathed patients Wunderlich, Jr., records 155 cases with sixteen hemorrhagic patients, or 10.3 per cent.; Immerman at Basel records 146 cases with six hemorrhages, or 4.1 per cent.; and Liebermeister 882 cases with fifty-five hemorrhages, or 6.2 per cent.

This is shown best by the following table:

WITHOUT BATH.

	Cases.	Hemorrhages.	Per cent.
Liebermeister	861	72	8.4
Griesinger	600	32	5.3
Wunderlich, Jr.	98	2	2.0
Total	1559	106	5.2

WITH BATH.

	Cases.	Hemorrhages.	Per cent.
Liebermeister	882	55	6.2
Immermann	146	6	4 1
Wunderlich, Jr.	155	16	10.3
Total	1183	77	6.8

To these may be added: In America, with baths, Wilson's 140 cases with ten hemorrhages, or 7 per cent.; Osler's 356 cases with twelve hemorrhages, or 3.4 per cent.[1]

It is interesting to note in this connection that Fitz places the general frequency at 5 per cent., and Loomis at 5 per cent. It is, however, only fair to state that Goltdammer, from nearly 20,000 cases, concludes that the bath does not increase hemorrhages. Brand claims that they are less frequent, as do also Tripier and Bouveret; but Roland G. Curtin tells us that upon investigation he found that since the cold-water treatment had been instituted the number of hemorrhagic cases has considerably increased, according to the hospital records that furnish the data, and in addition the mortality of the hemorrhagic cases is largely increased, viz., from five in seventeen, less than one-half, to twenty-five in forty-three cases, or over one-half; and further, on inquiry he found that in two of his tabulated cases the hemorrhage seemingly took place while the patient was in a bath, and in one case immediately after a bath.

An important point in this connection is the question as to the real danger from hemorrhage to the patient. In this opinions greatly differ. Thus Fitz tells us that it is always a serious symptom, but rarely fatal in private life; but that it may be very disastrous is shown by the fact that Liebermeister mentions forty-

[1] Only 299 were bathed.

nine deaths due to this cause out of 127 deaths, Murchison fifty-three deaths from hemorrhage out of 100 deaths, and Homolle 44 per cent. in 498 deaths. Osler asserts that death occurs in from 35 to 50 per cent. of hemorrhagic cases. Out of Griesinger's thirty-two cases of hemorrhage ten died, seven of these within four days of the hemorrhage. Liebermeister tells us that among his own cases 38.6 per cent. died when they had hemorrhages as against 11 per cent. without this accident; and Tyson tells us that the 7 per cent. mortality in his cases under the bath treatment was due entirely to hemorrhage or perforation. It is evident that Osler's percentage is about correct.

Relapses. It is admitted by advocates of Brand's method that relapses are more common under its use than without it. Osler met with fourteen cases of relapse in 160 cases bathed, or 8.7 per cent., but mentions five other cases of doubtful relapse, which raises the percentage; while Shattuck met with twenty-one in 129 cases, or 16 per cent., and eleven occurred before primary fever ceased. Wilson tells us that it occurred in 11.3 per cent. of his cases, and Osler tells us 8.7 per cent.; Shattuck, 16 per cent.; Immerman, 15 to 18 per cent.; Baumler, 11 per cent., and Jaccoud 9 per cent., varying from 1 to 15 per cent. As against this we may place the frequency as given under no bath treatment. Thus Murchison gives it at 3 per cent.; Gerhardt in 4000 cases, 6.3 per cent.; Griesinger puts it at 6 per cent., and Strümpell at 4 to 16 per cent.[1]

At the Presbyterian Hospital in New York Gilman Thompson found the relapses in 193 cases to be 13.5 per cent., which is 2 per cent. higher than in 284 cases treated by all methods during the same time.

Liebermeister says: "In Basel, before the introduction of this treatment, 861 typhoid fever patients gave us sixty-four relapses, or 7.4 per cent., two of which were fatal; after the introduction of this treatment, 882 typhoid fever patients gave eighty-six relapses, or 9.8 per cent., ten of which proved fatal. *It appears, therefore, that the proportion of relapses and the number of deaths*

[1] It is not possible for us to discover if all the cases of Gerhardt and Griesinger were treated without the bath.

are both actually increased under the use of cold water." And discussing the probable bearing of these results, he adds: "At present the probability certainly seems to be in favor of the affirmative of the question, the more so as it appears that the frequency of relapses is greater in proportion as the antipyretic treatment has been the more systematically employed." Biermer has also found the frequency of relapses increased since the introduction of cold baths.

On the other hand, Murchison with his extraordinary opportunities, places the percentage at 3.[1]

Having determined the fact that relapses are more common under the cold bath, we must determine what are the dangers of a relapse. As a rule, we believe relapses are milder than the primary attack, provided the primary attack has been severe.[2] On the other hand, if it has been rudimentary or in the class called by some writers "typhus levissimus," then the relapse is more severe. In any event, the relapses are characteried by a greater suddenness of onset and usually a shorter course. That the relapse is an element of danger seems self-evident, since it comes on in a patient already exhausted by disease. Therefore the prognosis is grave according to the severity of the relapse and the state of the patient. It is interesting to note that in Liebermeister's cases, out of 111 of simple relapse the fever was longer in duration than in the first attack in thirty-seven, shorter in sixty-eight, and of the same length in two. In twenty-nine of the cases the primary attack was mild and in eighty-two severe, but the relapses were mild in forty-seven and severe in sixty-four, and seven of these died in the relapse.

Other figures might be stated, but these seem sufficient to prove that relapses are dangerous to the patient and to be avoided if possible. This is still further emphasized by the fact that at Basel out of 115 relapses hemorrhage from the bowel occurred four times, perforation twice, thrombosis once, pulmonary consolidation

[1] It is interesting to note in this connection that in Wilson's cases out of the twenty-five in which the bath was commenced within the first week there were no less than four relapses.

[2] Flint is the only author of note who thinks that the relapses are more severe than the first attack.

nine times, nose-bleed seven times, bed-sores four times, abscesses five times, and petechiæ three times.

To quote Liebermeister again: "If we take the reports of the years 1869, 1870, and 1872, at Basel, we find, among 467 typhoid fever patients systematically treated with cold baths, thirty-three deaths and fifty-five relapses, six of which were fatal; the frequency of relapses, therefore, counting only those patients who had survived the first attack, was in the proportion of 12.5 per cent., as against 9 per cent. before baths were used. The higher rate of mortality among the relapses, too, were treated antipyretically, which ought rather to have given us a lower death-rate."

Perforation. An interesting question is the effect of baths on intestinal perforation. What the ordinary percentage of this accident is is in some doubt, but according to Murchison it is in the neighborhood of 3 per cent., and this is about the percentage reached by Osler in cases bathed and not bathed.

The most interesting comparative statement as to the frequency of perforations with and without the bath is that made by Mason. Thus at the Boston City Hospital the percentage of perforations in males was 1.4 and in females 1.3, while under the cold bath in Brisbane it was 3.6 per cent. in males and 1.6 per cent. in females; Liebermeister's statistics, viz., that there were twelve cases of this accident in 973 patients before the bath and fourteen in 1108 after it was introduced, show a very slight difference.

The mortality of this accident is very high. Of 1721 autopsies the percentage was 11.3, according to Murchison. According to Osler, it was found in 2000 Munich cases 114 times (5.7 per cent.), and in twenty out of eighty of his deaths.

Duration of Disease. The influence of the bath treatment on the duration of the disease seems to be to prolong it. It is necessary to determine the ordinary duration with and without baths. Very important classifications of cases are those made by Liebermeister and Jurgensen. The first of these clinicians speaks of the mildest cases as those in which the rectal temperature never or rarely rises above 103°, and the duration of fever does not exceed eight days. Such cases require only dietetic treatment, and cannot be used to show the value of different modes of treatment.

The mild cases do not have a rectal temperature above 104.8°, and the fever lasts sixteen days. The severe cases are those in which the rectal temperature rises above 105° and the fever ceases by the twenty-first day. Jurgensen considers all cases mild which have no fever after the tenth day, and severe those that have fever after this date.

Murchison states the mean duration in seventy-five cases to be a fraction more than twenty-four days. Flint states from going to bed to normal temperature sixteen days, with a maximum of twenty-eight days and a minimum of five days. Longest case seen by Flint was fifty-eight days.

Of forty-five of Flint's fatal cases the duration was a fraction more than fourteen days. Murchison tells us that the mean stay in the hospital of 500 cases which recovered was 31.24 days, of 100 fatal cases 16.52, while the average duration of illness before admission of the 600 cases was 10.78 days. Again, Murchison states that the pyrexia, as a rule, lasts at least three weeks, and the ordinary duration of enteric fever is from three to four weeks. Of 200 cases which recovered, and in which he was able to fix the commencement with tolerable certainty, the duration was: ten to fourteen days in seven cases; fifteen to twenty-one days in forty-nine cases; twenty-two to twenty-eight days in 111 cases; twenty-nine to thirty-five days in thirty-three cases.

The mean duration of the 200 cases was 24.3 days, and the mean duration of 112 other cases, which were fatal, was 27.67 days.

The average duration of residence in St. Thomas's Hospital, London, in 1894, 1895, and 1896 was from 43.1 to 51.8 days, and the average duration of fever from 14.3 to 16.73 days, although a great proportion of the patients were admitted in the first or second week.

If we take the twenty-five cases admitted in the first week of the disease given in Wilson's table, we find that the average stay of these patients in the house was forty-one days ($40\frac{8}{9}$), and the average day of normal temperature the nineteenth. The average maximum temperature was 104.6° (40.3° C.). If the entire 108 given in his last table in his article are studied, we find that the average duration of the fever was in the cases admitted in the

second week 23.2 days, in the third week 27.3 days, and the average stay in the house of the second week cases 40.8, and of the third week cases 38.8 days. These figures would seem to contradict Wilson's statement that his patients, as a rule, return to their homes in two weeks from defervescence.

Gilman Thompson states emphatically that the cold bath does not ordinarily shorten the duration of the disease.

To summarize the points so far covered, we find that the mortality for typhoid fever to-day all over the world, except in the presence of individual epidemics of malignant infection, is not over 15 per cent., and if the cases receive good nursing and nonmeddlesome treatment, about 10 per cent. or less.

That in American hospitals, under the best men in the profession, the mortality of typhoid fever is about 7.5 to 8 per cent., and sometimes 10 or even 18 per cent.; therefore, the saving of life by the bath is not the difference between 25 per cent. and 7 per cent., but between 10 per cent. and 7 per cent. at the very best.

That this method does not shorten the attack but probably prolongs it.

That relapses are much more frequent under it.

That hemorrhages are more frequent, when in reality the modification of all the symptoms by the bath would lead us to expect a decrease in their number.

That the frequency of perforation is not decreased.

If the general mortality of 15 per cent., as we have shown exists, is reduced to 10 per cent. by good nursing and treatment, and the mortality under the bath amounts to about 7.5 per cent. at the very best, as it does in the hands of all American observers, it is evident that the cold bath is responsible for a saving at the most of but 2.5 per cent.; and it is also evident that this 2.5 per cent. is saved by the favorable effect of the bath on the nervous system, circulation, respiration, and the toxæmia, for the other causes of death remain unaltered in frequency or are increased.

With the manner in which these good effects are produced we shall deal a little further on. It yet remains for us to determine what are the defects of this method, then to consider how it does good, and finally whether any better plan or modification can be adduced.

In the first place it would seem an opportune time to protest against the almost universal application of the bath to this disease. It is, or ought to be, a fundamental law of therapeutics that there is no such thing as treatment by hard-and-fast rules of routine. The recommendation that all cases of typhoid fever with a temperature of 102° to 102.5° F. shall be placed in a tub of water at 65° to 70° F. is an affront to this rational law. Until all human beings are exactly alike in every attribute and characteristic, and all micro-organisms are possessed of equal virulency, power of multiplication, and growth, every case of infectious disease seen by the physician will require careful study if the best results are to be obtained. He must modify his treatment to fit his case. It may be that some general trend of method is suited to all cases, just as a coat is needed by all inhabitants of cold countries, but each individual needs a modification of the coat to fit his figure and necessities. Digitalis is useful in twenty-drop doses in many cases of valvular heart disease, it is useful in other cases in smaller doses, and in some not at all useful; and even a specific remedy, like quinine for malaria and mercury for syphilis, is subject to grave modifications in every case we meet if the best results are to be obtained.

It must be evident that, as the temperature is far more easily reduced in one patient than in another, the temperature of the bath should be modified to the case, as well as the duration of the bath. Every one knows how in one patient with a temperature of 104° the temperature is easily lowered, while in another, because of the severity of the disease, an excess of fat, or other causes, the reduction can be caused only by great effort.

When we consider all the points in the cold-bath treatment it is almost impossible to avoid the thought that it is a measure to which in a few years we shall look back with the same distress that we regard excessive venesection and other excesses. We are now told to plunge practically every case of typhoid fever into a bath at 70°, to keep the man shivering, chattering, and blue in the water for some twenty minutes, then to lift him out on a bed, place a hot bottle to his feet and perhaps elsewhere, and give him a drink of whiskey to overcome his feebleness and chills. Truly he is cast

from the heights of pyrexia to the degradation of collapse, and then with a swift turn stimulated to renewed febrile efforts. That the mortality is decreased by this method may be partly true, but to use a simile, are we not using croton oil to move the bowels in all cases, when cascara will do equally well in a number, and the croton oil is required only in a few?

These facts have been recognized by so many eminent men of very large experience that it would seem unnecessary to quote them were it not that followers of the cold-bath plan have recommended its use in every case of the disease which comes to their hands. Thus we find one of the leaders in his enthusiasm of this method of treating this disease telling his readers that he has used it continuously for seven years, that it has been the "only treatment" in his wards, and that all patients suffering from this disease have been submitted to it except very rare cases in which the axillary temperature has not reached 101.5°, those brought in in a dying state, and those admitted after the third week. He also stops the bath in the presence of hemorrhage and perforation. And again, we are told that the patient receives a full bath at 65° to 70° every five hours when the rectal temperature reaches 102.2° or over. Other clinicians do likewise. On the other hand, we find no less an authority than Strümpell making the following statements:

"In so far as the height of the fever furnishes an indication for baths, we may accept, say, 103.6° F. (39.8° C.) in the rectum as the temperature calling for a bath. At night we have given baths very seldom, except when forced to by extremely high temperatures or other bad symptoms. It must be a mistake to wake a patient who is quietly sleeping, and put him into cold water, even if his temperature is above 104° F. (40° C.). Likewise, in cases where the temperature shows considerable spontaneous remissions, there may be no use in inflicting a cold bath upon a patient who has high fever only temporarily.

"It is not always advisable to use baths, however advantageous this treatment may be, in typhoid fever. There are a number of contraindications which cannot be disregarded, as great weakness or great sensitiveness, such that the excitement caused by the bath

might do harm. Sometimes baths are followed by severe rheumatic ('rheumatoid') pains in the limbs, and often they seem to promote the occurrence of furunculosis. In such cases it is often necessary to omit the baths, or at any rate to employ them less often and at a warmer temperature. The same is true if a severe laryngeal affection develops, or otitis or nephritis. Nothing seems to us a greater mistake than to attempt to establish a scheme for the treatment of typhoid fever by baths that shall be always applicable. Here, if anywhere, the only correct way is to treat each individual case according to its special symptoms and circumstances."

Brand himself modifies the bath, and states that he always uses warmer baths for twenty-four hours if the patient has been ill as long as four days, and his enthusiastic follower, Baruch, tells us that, like all agents that are powerful for good, this method may produce irreparable damage (Baruch, p. 42). The depressing effect of the bath has been noticed by Liebermeister, who considers a high degree of cardiac weakness an important contraindication. He also points out that some patients cannot bear a sufficient repetition of them, and that other contraindications to their use may exist.

Osler also tells us that the baths have often been changed to cold sponges on account of profound weakness, tenderness, and swelling of abdomen, signs of perforation, and because of the active protestation of the patient. Out of 356 cases only 299 were bathed, showing that in Osler's view a fairly large proportion of cases are not suited to the bath.

Finally, the patient must be strong enough to react and rally from the bath. As we shall show, all the good effects come from reaction, and Baruch points out that the bath which is of benefit in the first week may in the third prove a fatal depressant (p. 62), and a very feeble patient in the first or second week is quite apt to fail to react.

Loomis has well said: "There is no remedial agent which requires greater care and judgment in its use than the cold bath, yet doubtless, when judiciously employed, the lives of many typhoid patients may be saved, and it is equally certain that when

injudiciously employed many lives may be destroyed. The general condition of the patient and the stage of the fever must be considered; also the effects of the first few baths must be carefully noted. Should a patient's temperature range at 104° or 105° F., it is no positive indication for the resort to a cold bath, or that a cold bath is the best agent to be employed for its reduction. If the patient after the second or third bath is more quiet, has less delirium (if delirium previously existed), if his breathing becomes easy and natural, if the heart's action is more regular and forcible, and he falls asleep and perspires, there can be no question in regard to the beneficial effects of the bath. If, on the other hand, the bath is followed by feebler heart's action, by dusky cheeks, by rapid respiration, and by coldness of the extremities, from which condition the patient rallies slowly and imperfectly, it is certain that, however high the temperature may range, harm will be done by continuing the baths. When the extremities are cold, or there is profuse hemorrhage from the bowels, or when from any cause there is great feebleness of the heart's action, and especially in the case of aged persons, cold baths are contraindicated."

A large number of other authorities might be named, but we may quote Nothnagel, who asserts that when there is cardiac feebleness along with fever, and especially when profuse diarrhœa is present, cold baths should not be used.

These quotations and the reasons given show that it is unwise and unnecessary to bathe in a tub every case of typhoid fever. This treatment has its limitations just as all others have theirs.

It is said by the bath advocates that if mild cases are not bathed they may become grave afterward, but if this is a valid excuse then we should bathe patients with a practically normal temperature or one below that in which the bath is recommended. Personally we cannot believe in this view. On the other hand, we believe that in cases with little fever the good nursing, massage, proper feeding, sponging, and care will be adequate.

We come then to a consideration of the questions, How is the good accomplished? and second, Cannot some modification of the present plan be adopted capable of attaining the same ends without the suffering of the patient and the immense labor involved,

and without some of the very serious drawbacks now found associated with it?

It seems to be universally conceded that in moderately severe cases of typhoid fever the reduction of the temperature is a comparatively unimportant effect of the bath, and in the cases of marked and severe febrile movement it is of great advantage over and above the apyretic influence. In other words, it is confessed that the cold bath in typhoid fever possesses an influence of great importance upon the general system far in excess of its antipyretic effects.

It is true that Liebermeister many years ago expressed a belief that the cold bath did good solely by lowering temperature, but at that time the effects of the bath on leucocytosis, oxidation, and the true influence of massage were not known, and his belief that the nervous symptoms are chiefly the result of the fever is no longer tenable,and is strongly combated by Strümpell and others. To use the words of Dr. Simon Baruch, the idea that high temperature is the chief determining cause of fatality in typhoid fever must be abandoned (Baruch, p. 110).[1] Further than this, the cold bath does not materially modify the whole body temperature, for as Baruch (p. 59) states in italics, "the fact is that the colder the bath the less intense its power of reducing internal temperature." He has often seen the mouth temperature after a bath of 65° in typhoid fever reduced to normal, while the rectal temperature was two degrees above normal. This is also stated by Liebermeister (*Handbuch der Path. und Therapie des Fiebers*, p. 102).

To any one who has studied the general subject of hydrotherapy it is evident that the cold bath exercises the same effect upon the bloodvessels that constant exercise of function always produces, namely, an increase in normal tone and ability to perform normal work. The bloodvessels are in one respect like rubber tubes, namely, they remain elastic as long as they are frequently exercised, and become brittle as soon as they lie idle. The cold bath, therefore, improves vascular tone, and the result of this is a decreased tendency to stasis of blood and lymph in the tissues.

[1] Baruch also says whoever expects to throttle the fever by the bath will be disappointed.

Further than this, the peripheral bloodvessels being first contracted by cold are emptied as the central ones are filled, and then as the reaction takes place the flow is reversed, as it were, and the peripheral vessels are flushed by an excess of blood, which cools the body by bringing hot blood to the surface and brings to the emunctory portions of the skin effete material for elimination. Finally, when the first shock and rebound of a bath are past the circulation settles back to a normal equilibrium, with the result that anæmic areas have been supplied with blood, congested areas relieved, toxic matter removed from contact with vital cells and carried to the eliminative organs; with the improved circulatory state these are active in their eliminative function. Further than this, by this means perfect oxidation of tissue takes place, and probably oxidation of the toxins of the disease ensues. Liebermeister, Röhrig, and Zuntz have shown that the use of cold externally increases oxidation in the body, so that a large amount of oxygen is taken up and more CO_2 is eliminated.

So far, then, we have a lowered temperature, an improved circulation, an elimination of toxic matters, and an improved nervous tone by removal of the fever and the poison. There is still another function performed by the cold bath, namely, an increased leucocytosis, as shown by the studies of Winternitz. This investigator has shown that the bath, and indeed all cold applications to the entire surface, greatly increases the number of leucocytes and the percentage of hæmoglobin, and Thayer, of Baltimore, has confirmed these observations, finding in typhoid fever in particular that the number of leucocytes is increased from two to nearly fourfold by this means. It would seem probable from Thayer's studies that this increase is an actual one, and not solely due to a dispersing of the leucocytes from certain areas out into the general circulation. So, too, Jacquet, of Basel, found that the red blood cells in the general circulation may be raised about 500,000 in febrile cases by the cold bath. Thermes has reached like results.

Again, no bath in typhoid is properly given if active rubbing of the body is not resorted to while the patient is in the bath. This massage aids the effect of the cold shock most efficiently,

possesses all the benefits of ordinary massage, and also greatly increases leucocytosis or leucocytic activity.

There is not space for any details in further support of these assertions; those familiar with the minute and general effect of massage know them well. J. K. Mitchell has shown that massage increases the number of the red cells and adds to their hæmoglobin value both in health and in anæmia.

Having indicated some of the chief methods by which the cold bath does good, we come to the second proposition, namely, Cannot some equally effective method be carried out less harassing and exhausting to the patient and devoid of the manifest disadvantages of the bath? We admit that it is not possible for us to present an array of statistics in support of the following suggestions, because it takes a long period of time to collect an array equal to those of the cold bath and a hospital service unusually rich in typhoid cases. One of us (Dr. Hare) has used cold sponging in a more or less active form for the past ten years in his hospital wards whenever it was needed, and has rarely, if ever, used the bath. His results in St. Agnes' and the Jefferson Hospitals suggest that the following rules be laid down for the treatment of typhoid-fever cases:

1. When admitted early in the disease, with constipation or moderate diarrhœa, the physician should give a full dose of calomel in divided doses in order to stimulate the liver and antisepticize the bowel with bile.

2. Control the fever when it reaches 102° F. by sponging. The patient being stripped and laid on a rubber sheet or blanket over such a sheet, he is to be sponged with water adapted in its temperature to his needs, and it is to be remembered the rapid application of a low temperature is more refreshing than the prolonged application of a higher temperature (Baruch). The chief advantage of cold sponge lies in the shock and reaction. This is better obtained by the use of ice sponging than by the bath. The patient's surface is always bright red in ice sponging, often blue in the bath, and that the fever is not the chief danger in the case renders the fact that as great a reduction from the sponge is not reached as from the bath of little importance except in hyperpyrexia.

Shattuck tells us that he has found no marked or constant differ-

ence in the antipyretic value of cold sponging at 60° for twenty minutes, the cold pack at 60° for twenty-minutes, or the cold bath at 70° for from ten to fifteen minutes.

Finally, if this does not bring the temperature down to 100.5° or 101° in twenty minutes, resort should be had to the tub.

It is essential when the sponging is used that more of it be applied to the back than the front of the body, for at the back the great muscles and thick skin retain the heat as a reservoir, which is not cooled if only the front of the body is sponged. Further, the posterior surfaces are the ones apt to be congested and sore from the dorsal decubitus, and therefore need the stimulant effect of the bath, as do the kidneys and other deeply situated organs. That this treatment is of value is shown by the marked redness of the skin, the improvement of the circulation and respiration, and the cleared mind. That it increases leucocytosis is proved by the following studies made in my wards by Dr. Holder, my colaborer in this paper.[1]

Blood Counts in Enteric Fever.[2]

Case.	Hæmoglobin.	Before sponging.		After sponging.		Hæmoglobin.
		Red blood cells.	White blood cells.	Red blood cells.	White blood cells.	
1	60 per ct.	4,800,000	7,000	5,200,000	14,600	70 per ct.
2	62 "	4,600,000	9,000	4,600,000	11,000	80 "
3	80 "	5,200,000	11,000	5,400,000	63,000	87 "
4	65 "	4,500,000	7,300	4,800,000	23,000	65 "
5	55 "	4,200,000	6,000	4,700,000	6,000	58 "

[1] As an illustration of the fact that we have no statistics giving a fair report of the effect of the moderate and *proper* use of cold in fever aside from the cold bath, we may cite an instance named by a recent writer. A male of eighteen received baths during the second week of an attack of typhoid fever, and was so seriously depressed by them that a so-called "cold pack" was used. This "cold pack" consisted, we are told, in wrapping a patient in a cold wet sheet and then wrapping him in a blanket for an hour. If there be any fever present such a pack in a very few moments becomes—not a means of materially reducing fever—but a hot Russian bath; and one of us knows of a case in this city in which a hyperpyretic patient was so treated and speedily died. The case quoted from another writer is cited by him as one which shows the comparative effects of cold bathing and cold packs, although the former were used in the second week and the latter in the third, and although the cold pack as described is not an antipyretic measure of any moment. This is not a comparison between cold bathing and cold sponging, yet one reading his text would get the impression that all other methods of reducing temperature than plunging in typhoid fever were inefficient.

[2] Technique: Thoma-Zeiss apparatus with Toisson's solution. For red blood cells from 32

3. It is advisable not only to use friction in a light form, but to use moderately active massage, with the same objects in view as when the rest-cure is undertaken, for the proper treatment of typhoid is a modified rest-cure. We are firmly convinced that by this means bed-sores, local congestions and effusions, œdematous swellings, peripheral nerve pains, and muscular feebleness will be largely decreased, and Pospischl has shown that mechanical irritation of the skin is capable of increasing heat loss 95 per cent.

4. In nearly all cases give more nourishment than the average typhoid patient has usually had in the past. Attention has recently been forcibly called to this necessity by Shattuck, and by one of us in the editorial pages of the *Therapeutic Gazette*. With the exception of broths, which are culture media for the bacillus of typhoid, and meats, almost any article easy of digestion should be allowed, as one or two or more lightly boiled eggs, corn-starch, arrow-root, etc.

5. Use stimulants in carefully graduated doses whenever the circulation needs them, particularly alcohol. Even the cold-bath enthusiasts give whiskey to overcome the depression they often produce.

Beyond these directions each case should be treated for the symptoms which arise from time to time. Let the physician be watchman constantly and a therapeutist or hydrotherapeutist only as necessity arises.

Finally, let us state that the object of this paper is not that of the iconoclast, nor that of one desirous of urging upon the profession any definite routine plan of treatment. It is an endeavor to determine the exact value of a well-tried plan, to point out the fact that a rigid routine is inadvisable, and to suggest that the cold bath itself is, perhaps, equivalent to using an engine when, in some cases, at least, hand power will equally well spin out the thread of life.

to 96 squares were counted. For white cells one platform with a "cut-off," making in all 1200 squares to each count. Hæmoglobin estimated by von Fleischl's hæmometer. This is from three separate counts at various times. A differential count with Ehrlich's triple stain showed slight changes, such as Thayer found, in the varieties of white cells. These changes are not constant, nor are they great enough to be of much value.

DISCUSSION.

Dr. Wm. Osler: Plato made the singularly happy remark in discussing the differences between the physician and the lawyer, that the physician would be very much better always to have a personal knowledge of the disease he professed to treat. I am a little disappointed this evening, Mr. President, for I had been given to understand that we were to have Dr. Hare's personal experience with the cold bath. The first comment I would like to make is to say that the doctor's statistics illustrate very clearly the elasticity of figures. I do not think there would be the slightest difficulty in collecting a series of figures from general hospitals which would show a very much larger average mortality from typhoid fever than that given by Dr. Hare. Take, for example, the statistics for the past few years of the London Fever Hospital, where they have not yet introduced hydrotherapy. The mortality there for the past five or six years has not been below 17 per cent. I think if Dr. Hare will look over the mortality figures of the general hospitals in this country, not only in New York and Philadelphia, but also in the other large cities, he will find that the average mortality from typhoid fever in hospitals in which hydrotherapy has not been introduced is very little under 15 per cent.

I agree with Dr. Hare that to follow a routine in any method is not scientific, and is likely to lead to serious error. I do not use the cold bath as a routine myself in all conditions. If a patient is in the third week and is improving I should not use the bath. In children sponging is often to be preferred, and in conditions of great weakness cold sponges should replace the bath. I do claim that in the general hospitals throughout the country at least five or six in every hundred cases of typhoid fever could be saved by the introduction of hydrotherapy. Did I not believe that this was a life-saving method I would not employ it for a day. The method can be used systematically in hospital cases, but the general practitioner may not be able to always employ it. One must take into account the large percentage of bad cases admitted to general hospitals, and to have a mortality of about 7.5 per cent. is the best advocate I know for hydrotherapy. It is 6 or 7 per cent. lower than in institutions in which under similar conditions other forms of treatment are employed. I am perfectly willing and shall, indeed, be delighted to change at any time hydrotherapy for a method proved to be more life-saving. We should use the best possible means to restore our patients to health, and in the care of typhoid fever I believe hydrotherapy as advocated by Brand meets this requirement.

Dr. James Tyson: Dr. Hare refers to a gain of but 3 per cent. by the Brand treatment over the results of improved nursing, which are conceded to have reduced the mortality to 10 per cent. Now, it is this 3 per cent. which constitutes the argument in favor of the bath-method. I believe all

who use the treatment attempt to discriminate; but it is not always easy to discriminate, and because of this difficulty it is better to use the method in a routine manner than not to use it at all. I feel that I have had sad experience in attempting to discriminate when, having decided against the bath treatment, my patients perished, and I have felt that had the Brand method been used they might have been saved. All that Dr. Hare has said as to our looking back thirty years upon the routine use of this treatment, as we now look back on the routine treatment by bleeding fifty years ago, may be true; but if so, it will be because we will have found something better. At present I know of nothing better or as efficient as the routine use of the Brand method.

I cannot but feel that any fair-minded person who has made sufficient use of this treatment must see that its effect is to mitigate all symptoms of the disease. At the present day the dry tongue and delirium are comparatively unknown, while the diarrhœa is very much diminished. These good effects are not counterbalanced by any discomfort to the patient. After considerable experience I do not think I can recall a single instance where any actual harmful results followed the treatment.

There are many minor objections to which Dr. Hare alludes which could readily be met. As to allowing patients to step into the tub, thus making an unnecessary drain upon their strength, it is not usual at the University Hospital, at least, to allow patients to step into the tub; but they are ordinarily lifted in, though I do not think it would harm the patient to allow him to step into the tub in the early stages of the disease.

As to perforation and hemorrhage, I do not think they are diminished, nor do I think they are increased. I think that the deaths in my practice since using the baths have been almost solely from hemorrhage or perforation. On the other hand, if I compare my experience for the last four years, as to deaths from hemorrhage in private practice where the baths have not been used, with those in hospitals where the baths have been used, I am sure I could find more deaths from this cause in the former. As to relapses, my experience is that they are not frequent. As to whether a relapse has occurred or not is sometimes a very nice point to determine. I am ready to admit my own inability to decide in many cases between a relapse and a recrudescence. I do not consider a case a relapse unless we have a return of the spots and the other essential symptoms. Judging from this stand-point, relapses are not frequent, in my experience.

As to the duration of residence in the hospital, I am never anxious to get rid of my patients quickly. I simply want to get them well and keep them until they can be discharged safely. This is sometimes sooner and sometimes later. I have never taken the trouble to ascertain the average duration of the disease, because it seems to me a minor matter in a disease of the natural duration of typhoid fever.

As to accomplishing the same results by other means than the Brand

method, I do not believe they are known to-day. I do not know how the cold bath acts, and I do not believe anybody else knows. While it is not by reducing the temperature, the good effect goes along hand-in-hand with the reduction of temperature, while the reduction of high temperature probably removes one of the sources of danger, though it may not be the chief one. If this can be accomplished by means of sponging or other methods, so much good is effected; but my experience has been disappointing. I do not get the same effect from sponging as from the actual tub-bath. Of course, there is a right way and a wrong way to sponge. Dr. Hare thinks the right way is to use very cold water. I do not care to have the water very cold. My plan is to cover the body with a film of water and allow it to evaporate, as I believe this is more cooling in its effect than the application of ice-cold water in any other way. It is not the temperature of the water, in my judgment, so much as it is the evaporation, which lowers the heat.

I am rather sorry that Dr. Hare has read this paper, as I fear it will have the effect, for a time at least, of setting back the treatment. There are a large number of men who are anxious for the excuse not to use the bath because it is troublesome. As to the defects of the bath treatment, I think a large proportion of them are due to the imperfect way in which it is carried out. The difficulties in the way of carrying it out literally are many. These include the labor to nurses, the objections of the patient, and the desire of the resident physician to try other means.

Dr. John H. Musser: I feel that the paper is capable of doing an immense amount of good or considerable harm. If it is read in the same spirit that Dr. Hare has presented it, and with the same idea in mind, I am sure it will be of great advantage to the profession, as it presents the advantages of the cold bath in a very precise and no uncertain manner. He shows a reduction in mortality of 2½ per cent. by this method over all others. It is to save that 2½ per cent. that we must bend our efforts; hence we cannot ignore this plan of treatment.

I have been much interested in his remarks on the lessening of the frequency of typhoid fever and on the diminishing of its virulence. No doubt at the present time we see a milder type than in the past decades, and it is possibly growing less virulent. Its pathological effect tallies with what is taking place in other infectious diseases, as syphilis and scarlatina. We know these affections have been much milder for some years past. One error, however, may creep in in the study of statistics which are to prove the mildness of the fever as seen at the present day. Typhoid fever is milder in children. The disease is recognized, and cases in this class are more frequently reported than formerly. As they go to make up the sum of all the cases, the larger proportion of mild ones thus introduced renders the death-rate lower. In the consideration of the mortality, therefore, this possible error should be borne in mind.

As to the dangers of the cold bath, I agree with Professor Tyson that no serious permanent symptoms arise in properly-selected cases, and, in spite of the discomfort, we usually see satisfactory relief from the threatening symptoms, although sometimes we can only secure an abatement of them for a short time. I have never seen collapse result nor any harm to the heart or nervous system.

In pursuing the cold-bath treatment one cannot be too careful in studying relapses. With baths I have seen the temperature held up at 99° for three or four days and then rise again. We should not consider a condition like this a relapse, and I quite agree that in the cold-bath treatment the disease is prolonged. Although the duration is protracted, however, convalescence is more rapid, and patients are able to resume their occupations earlier.

I am very glad that Dr. Hare called attention to other methods of using water. It is not the cold bath that is essential, nor the method bearing the name of "Brand;" it is the external use of water. I do not hesitate to limit my cases to the use of cold, and in children rely more upon the warm bath and warm sponging. I have a case at the Presbyterian Hospital—an adult—in whom warm baths have produced the most satisfactory results. The external application of hot or cold water by sponging or by baths must be decided upon in each individual case. Certain it is, however, that such application is of the greatest advantage and productive of the best results. No routine or rigid rules can be laid down in any case.

I was very glad Dr. Hare referred to food, as I am sure we often do not feed our patients enough, and many of the symptoms are the results of exhaustion.

Dr. J. P. Crozer Griffith: I wish to say a few words relative to what Dr. Hare has remarked upon the effect of improved nursing in diminishing mortality in typhoid fever, since I am unable to agree with him in the explanation of the good results generally attributed to the employment of the Brand method. I have been one of the attending physicians to St. Agnes's Hospital almost from its beginning, now ten years ago; have spent a great deal of time in the wards, and have watched the nursing there carefully, both as it is now and as it was in the beginning. There is not to be found anywhere, I believe, a more careful, painstaking, devoted set of women than the nursing sisters of this hospital. Yet they are now, and have always been, greatly handicapped by the fact that there are not enough of them. This is not a fault. It is a misfortune. Improvement in nursing in hospitals is, I think, chiefly dependent upon the fact that nowadays not nearly so many cases are assigned to one nurse, and as a result the patients can receive more attention. This is not so in St. Agnes's. The nursing has improved there greatly, it is true; but this alone cannot account for the diminution in the typhoid-fever mortality, since in this one most important feature, the increase of numbers, there has been practically no

change. The number of sisters is practically no greater than ten years ago.

Now, during the early years of this institution chiefly symptomatic treatment of typhoid fever was employed in the hospital, with occasional excursions into antiseptic medication and the like. Somewhere about 1892 or 1893 the Brand treatment was instituted by all, or nearly all, the attending physicians, and has been continued ever since. If any of the physicians have clung to the old methods, it is evident that any marked improvement in the general mortality of the disease redounds still more to the credit of the Brand method, since the average good percentage of the Brand cases has probably been reduced by the higher mortality figures of those cases in which the course of treatment was unchanged.

I wish to say here that our mortality statistics include every case dying in the hospital. Even those entering moribund with the disease, and dying in less than twenty-four hours, are counted in. Our actual results of the hydrotherapeutic treatment are, therefore, still better than our figures indicate, and we certainly have no reason to be ashamed of our figures, as the following statistics show.

There have been in all in the hospital in the ten years a total of 642 cases of typhoid fever. These are divided as follows:

April, 1888, to January, 1891 (two years, eight months), 178 cases; 34 deaths; mortality, 20.33 per cent.

January, 1891, to January, 1893 (two years), 120 cases; 23 deaths; mortality, 19.18 per cent.

January, 1893, to January, 1895 (two years), 125 cases; 11 deaths; mortality, 8.8 per cent.

January, 1895, to January, 1896 (one year), 67 cases; 4 deaths; mortality, 5.97 per cent.

January, 1896, to January, 1897 (one year), 73 cases; 3 deaths; mortality 4.1 per cent.

January, 1897, to January, 1898 (one year), 79 cases; 4 deaths; mortality, 5.06 per cent.

If we group these cases in two periods of five years each, we find that in the first five years, in which the older expectant treatment was urged, there were 298 cases with 57 deaths, a mortality of 19.13 per cent. On the other hand, in the last five years, during which the Brand method was largely used, there were 344 cases with but 22 deaths, a mortality of only 6.4 per cent. In the last three of these five years, during which the Brand method was still more uniformly employed, there have been 219 cases, with only 11 deaths, a mortality of but 5.02 per cent.

It is evident from the foregoing that the Brand treatment has done good, and that there is nothing else discoverable which has. I for one feel obliged to use it until something else is found which can give me as good results. Of course, not every patient bears this method of treatment. In such cases

the method is at once abandoned. It is impossible to establish a rule to tub every case at a certain body temperature, no matter what the effect. The greatest judgment is always required.

I would like to add the following statistics regarding the mortality of typhoid fever in the Children's Hospital of this city.

During the existence of the hospital there have been in it 171 cases of typhoid fever, with 13 deaths, a mortality of 7.6 per cent., showing the low mortality which exists in children as compared with adult life. From January, 1892, to January, 1898, during which more or less tubbing was employed, there were 93 cases, with but 3 deaths, a mortality of only 3.2 per cent. This certainly shows a very great improvement. It must be said, however, that we do not use the Brand method in this hospital in the strict sense of the term, for our experience has been that children bear this badly. The good results have been due to hydrotherapy, but not to the use of water at the temperature and according to the exact methods recommended by Brand. In some of the older children water as low as 75° F. is employed, but this is the exception rather than the rule. We usually use water of 95° F. gradually reduced to 85° F., and accompany this by friction. The children do not stay in the tub longer than ten minutes, and generally not more than seven. Indeed, many children do not bear tubbing at any temperature, and I have seen cases where there have been threatening symptoms produced by the application of water in any way.

Dr. Horatio C. Wood: Twenty-five years ago Dr. John Guitéras had typhoid fever, and I attended him. At that time no one was using the cold bath, but I insisted on doing it, and lifted him into the tub myself. As I was doing so I well remember his saying to me, "Doctor, doctor, this is the only treatment of typhoid fever I have ever seen followed by immediate death." I shall never forget the cold chills that ran down my back, as I knew what the profession would say if I had killed him; but he got well. Since that time I have followed this system of the use of water in typhoid very carefully, and though my hospital position has now for some years been solely in connection with the nervous system, I always have had more or less typhoid fever in private practice.

The paper of Dr. Hare seems to me to show how people can agree and yet, from the difference of putting things, seem to be in opposition. Dr. Hare admits that the Brand method has reduced the mortality from 10 to 7.5 per cent., and considers this 2.5 per cent. very little; but, if we say that the mortality has been reduced one-quarter, it seems much more.

Further, the mortality applies to all cases that come into a general hospital, and of these at least 2.5 per cent. are practically moribund when they enter. Subtracting these cases, it will be found that of the cases which are seen early enough for treatment to be of avail, the mortality is reduced from 7.5 to 5 per cent, a reduction of the mortality-rate one-third by the use of cold water.

I am afraid that Dr. Hare's paper may be used to make more difficult what is already very difficult, that is, getting people to submit to the inconvenience and unpleasantness of the bath. At the same time the paper may do good by calling attention to the limitations of the Brand method. It has been one of the great pleasures of my life that I was instrumental in helping Dr. Hare to lay the foundation upon which he has built up his rising greatness. In Dr. Hare's time at the University we taught always the external use of water, which he has advised to-day; but never to use it at a lower temperature than was required. The teaching was always to use the least severe measure that would accomplish the result, namely, the lowering of the patient's temperature; first sponging, then the cold pack, then the bath at 90°, then the cold bath.

Dr. Hare's explanation of the way in which the bath acts may be true, but there certainly is no proof of it; it sounds to me much like a fairy story told by a man of genius, and I think it wiser to acknowledge ignorance of the method in which good is accomplished. Certainly, however, the fall of the bodily temperature produced is the measure, if not the cause, of the good achieved.

The comparison of the treatment of typhoid fever by Dr. Hare with the rest-cure is not altogether a happy one. Rubbing the limbs when the patient is in the bath, for the purpose of maintaining the circulation in them, is all right enough in typhoid fever; but the use of real massage would, in my opinion, do great harm to the patient. In the rest-cure massage is used as an artificial exercise; in typhoid fever even artificial exercise is to be absolutely avoided.

In regard to the contra-indication of the use of cold in typhoid fever, I believe that the cold bath is dangerous whenever, in a low fever, there is pronounced cardiac failure; the bath drives the blood from the surface of the body into the interior, and probably may so increase the strain upon the enfeebled heart as to further interfere with its action and produce local congestions or even complete heart failure. In a case of typhoid fever, even though the temperature be high, pronounced cardiac adynamia seems to me to be the natural contra-indication to the use of the bath. When there is internal hemorrhage the temperature usually is low and the bath not required; but the tendency of the bath to drive the blood inward would make one hesitate in using it in hemorrhage.

The use of the external cold has certainly changed the aspect of the average cases of typhoid fever, so that it is very rare to see the sordes and delirium and other symptoms of the profound typhoid condition which were formerly almost universally present in the disease. Although it is so frequently asserted that the use of cold increased the length of stay in the hospital, I am sure, from my experience, that by preventing the development of extreme exhaustion it really lessens the period of the patient's disability; convalescence, after it has once set in, being more rapid, and the

return of the power of work faster than was customary under the older methods.

Dr. Balliet has been treating patients by a continual bath of cold air instead of by the intermediate bath of cold water, putting the fever case under the open window with no covering but a sheet. If in the use of this method the nurse should lose her watchfulness and the exposure be continued after the temperature of the patient has fallen, serious injury might result. This is a theoretical objection to the method employed by Dr. Balliet that has always seemed to me to have some force.

Dr. S. Solis-Cohen: I had made several notes of disagreement with Dr. Hare, but as other Fellows have spoken on these points, I shall not do so, but rather emphasize agreements. Routine treatment of any kind is dangerous, because it encourages the physician to stop thinking, and with many very little inducement is necessary to that end. Rather than go to the trouble of individualizing their cases, some men with medical diplomas will even use nostrums. If routine treatment of any kind must be employed in the management of patients with typhoid fever, unquestionably Brand's method should be chosen. It has saved and is saving thousands of lives. But a better plan is to use it only when it is the best treatment for the individual patient. I am convinced that at present it is applied in many cases in which the patient would have been better off had it been omitted. The question is, how shall we discriminate? I know of no way except to use one's own good judgment, considering all the circumstances of the patient, of the disease, and of the environment. There is a "feeling" that cannot be described in words that governs the wise physician in his choice of remedies, and this will be so long as the practice of medicine continues an art rather than an exact science. The basis of good treatment in typhoid fever is unquestionably hydrotherapy; but it should not be restricted. It is not the Brand method, or the external application of cold, or the external application of water, but hydrotherapy, not meaning necessarily the use of cold water or of hot water, nor external applications only. The mere administration of sufficient drinking water does much good; and in my own experience it is often necessary to instruct nurses to give water to the patients, and not wait for the patients to ask for it. So, too, in some instances flushing of the colon with cold water, hot water, or hot salt solution is beneficial. A cardinal failure of exclusive hydrotherapy, however, whether Brand's method or other, is the disuse of intestinal antiseptics and other appropriate drugs—for example, strychnine—in some cases. I have elsewhere published my views upon this question, and I do not wish to burden the College with a reiteration; on the other hand, many cases do well without interference. I remember before I graduated in medicine (that is more than fifteen years ago), going through the wards of the German Hospital with my brother, Dr. J. Solis-Cohen, who was at that time using in enteric fever cases cold bathing, cold sponging, etc., or, when he

thought best, letting the patient alone. In one fall I saw there about fifty cases that had been left alone—that is, simply nursed, and all recovered; but this cannot be done in every case.

Now a word or two on the other side. If the symptoms call for the application of the Brand method, I think all who have had any experience with it will admit that, as Brand said, "it changes the entire aspect of the case." Brand called his method, not the routine, but the systematic application of cold bathing. The statistics and studies of Liebermeister, referred to by Dr. Hare, are not hydrotherapeutic, but antipyretic, and are rejected by Brand in estimating the mortality of the method he advocated. This and similar facts will vitiate some of the tables that Dr. Hare has shown us. As to the one including some 19,000 cases treated by cold water in some fashion, but not Brand's fashion, Brand collected these cases to show what cold water would do, even when faultily applied; while his own statistics were much more favorable, showing a mortality of less than 2 per cent.

As to hemorrhage, the fact that most of the cases that are treated by hydrotherapeutic methods and die, die of hemorrhage, simply proves that other causes of death have been eliminated.

As to the increased frequency of relapses, it may fairly be claimed that many patients treated by hydrotherapeutic methods live long enough to get relapses, whereas, otherwise they would have died in the primary attack.

While I am an advocate of the use of the Brand method in all proper cases, and urged it years ago when those now urging it laughed at me, I agree with Dr. Hare, that the profession are about to go to an extreme in cold bathing, as they used to go to an extreme in the use of drugs. Neither drugging as a routine, nor tubbing as a routine, is necessary, but good judgment in the use or avoidance of both.

Dr. Tyson has hardly stated the position correctly in saying that with reduction of temperature the dangers of the disease are diminished. If he were writing he would probably put it the other way—that is, that when the severity of the disease is diminished the temperature falls accordingly. The temperature is an index only. By merely altering the index we accomplish nothing. We cannot stay the sun by putting back the hands of the clock. Mere reduction of temperature will not increase the patient's chances of recovery. Antipyrin will reduce the temperature, and will also increase the chances of death.

Concerning methods that may be used when the cold bath is needless or impracticable, I should like to repeat what I have said elsewhere of the utility of continuous application of cold by means of ice-bags over the abdomen and upon the head. I have kept up the application of ice to the abdomen for two weeks, without intermission, in the case of my own child. In this case, I may add that the patient struggled violently against the bath, and, therefore, was not subjected to the systematic Brand treatment, yet hemorrhage followed. I feel inclined to believe, however, that whenever a

patient violently rebels it is good practice not to insist on the tubbing. Usually in cases suitable for bathing the relief is so great that patients will submit with good grace; sometimes they ask for it.

Dr. Arthur V. Meigs: There is nothing I can add to the statistical side of the question, but I wish to record my belief that routine bathing does not accomplish all that its advocates wish us to believe. My opinion upon this point has not been reached without experience. During some years I have used the baths in a routine way at the Pennsylvania Hospital, and other years only in cases I thought might be benefited by them. At the present time our staff, which consists of four physicians, is evenly divided upon the subject—two of us using the baths as a routine treatment, and two not doing so. The enthusiasts would have us believe that delirium is rare and the nervous symptoms greatly modified in patients bathed; but I have seen these symptoms severe in those who have been consistently bathed, just as in patients who were not. Again, they speak as though they would have us think that bathing controls the temperature. The truth is, however, that it does not. In severe cases with high temperature a cold bath will often reduce the temperature to normal, or even below; but if the charts are carefully examined it is seen that in most instances a short time after the patient is removed from the tub the temperature returns to as high a point as before. As the baths are ordinarily given every three hours, the result is that the temperature is low for half an hour or an hour, and the rest of the time (two hours or more) it is often as high as in cases not bathed. One of those who have spoken upon the subject has said that if it could be shown that the mortality from typhoid fever in hospitals has become less since bathing was introduced, this diminution of the mortality of the disease must be attributed to the good results of the system of bathing. He forgets that within the last few years many attacks of mild fever, which would formerly have been given different names, are now classed as typhoid fever. These mild attacks of fever of which no one dies, and which are now classed as typhoid fever in the hospitals, reduce the reported mortality percentages.

Dr. A. A. Eshner: Dr. Hare's criticism would have been thoroughly justifiable if the Brand method of treating typhoid fever consisted in the routine and indiscriminate use of the cold bath. The actual conditions, however, are quite the reverse. Brand's plea was for the systematic and discriminating use of the bath, and his directions may be looked upon as a formula, the numerals of which may vary in individual cases, although the fundamental factors remain the same. The best results have been obtained by those who have most carefully followed the rules laid down by Brand, and the results have suffered as modifications of and deviations from these rules have been attempted.

Dr. Balliet: For the past eight years I have been using cold-air baths instead of water-baths, to control high temperature in fevers. I do this

principally as a matter of convenience, since the Brand method is not always practicable in private practice. I commenced to employ this method in the winter of 1889 and 1890, and have been using it ever since with great satisfaction. The first case was one of double pneumonia in a man, fifty-nine years old, in whom the temperature advanced to 104.5°. I removed all the bed-covers from the patient as low down as the hips, and then opened the windows and allowed the cold air, at a temperature of about 22° above zero, to play upon him until his temperature fell to 101.5°; after that the windows were closed, but the covers were still kept removed. In this way the patient was cooled off daily during the period of high temperature until convalescence set in.

The principle upon which I base this method of treatment is the fact that it is always available, that it is safe, and that it is efficient when properly used. Its safety depends upon the fact that no person can possibly take cold from exposure, of whatever kind, so long as the temperature is above normal. It requires a normal or subnormal temperature before cold can be taken, and in view of this fact the only care which need be taken in a fever case is that the temperature should never be allowed to fall to normal while the patient is exposed.

I very rarely (and in small children, never) allow the extremities of a patient to be uncovered, because in them a free circulation should be encouraged as an aid to reduce the central temperature, and if I find the feet of a patient to be cold while the body temperature may be even 104° or 105°, I at once order heat to the lower extremities, although the patient may elsewhere be exposed to reduce the fever. It must be remembered that the high temperature in fever can only do harm to the organs located in the head, the chest, and the abdomen, and in those parts the temperature has to be kept under control.

This method can, however, not be carried out by any fixed rule, but, like the water-baths, the severity of the measures taken must conform to the severity of the fever to be controlled. The only hard-and-fast rule I could lay down is, that you always meet the indication, and bring down the temperature, and if slight exposure will do this it is sufficient; but if it takes a cold blast at a temperature of eight or ten degrees above zero to reduce the fever, nothing less can be employed. But not often do I find it necessary to open the windows in bitter-cold weather and have the patient stripped and exposed to such severity; but there are cases in which nothing short of this will answer the purpose. In such cases I always do this myself, and stay with the patient until the temperature is reduced to about 102.5°, then I close the windows and let the temperature of the room do the rest. In mild fevers it is often sufficient merely to exclude all heat from the room and keep the patient uncovered to the hips. In more severe cases open windows may be necessary during the hours of the highest fever, and the balance of the twenty-four hours the fever is controllable without

open windows. I make no difference, in reference to the kind of disease in which an elevated temperature occurs, in the use of this treatment. I employ it in scarlatina, diphtheria, influenza, pneumonia, and typhoid, and I have used it in several cases to reduce the elevated temperature of acute Bright's disease. The cause of the fever has absolutely nothing to do with this antipyretic, so long as the temperature does not fall to normal while the patient is unprotected.

There is, naturally, a fear and timidity on the part of parents that the patient will take cold from the exposure, but it is only necessary to explain to them that cold cannot be taken so long as there is fever, but that caution is necessary after the temperature becomes normal. I have never yet had a case that took cold from this source, nor had I more than two cases in whom this treatment was positively declined, and it was even here through outside influences that the family became frightened. The safety-valve against the taking of cold lies in the fact that the patient's natural feeling for more protection guides him in seeking the bed-covers when his temperature approaches normal; and I find that even children will do this, and need a great deal less watching than might be imagined. But a patient should never be allowed to fall asleep without being protected with covers, since sleep becomes possible only when the temperature is falling, and is an index of its decline.

During the hot months of summer this plan has to be modified. I put the patient near an open window with a good air-current, and order him to be kept moist to the extent of a perspiration, and then trust to the evaporation to reduce the fever. The temperature yields slowly but very surely, and can be kept at any point desired.

The advantages of this method in private practice are, first, that the temperature is not allowed to fluctuate between 101° and 105°, as it does in the water-bath treatment, but is always kept at a moderate degree; and second, that the plan is available under all circumstances, and can be applied and directed by the family without any trouble, after giving them detailed instructions.

Dr. Hare: Dr. Wood has misinterpreted what I had said. The whole point is that any routine method is bad and exactly what he advocates is good. It is hydrotherapy that we ought to employ, and not one particular form of hydrotherapy. Digitalis is good in many cases, but not in every case. The whole fault with the treatment by the so-called Brand method is the fault that I quoted. Some people who are employing this method are so convinced of its usefulness that they will not employ anything else, as they are satisfied there is nothing better.

Dr. Osler has said that I will find the mortality has been reduced to from 17 to 15 per cent., which is the very fact I proved at the beginning of my paper. After having shown that the disease was decreasing in frequency and in its mortality I attempted to show what the average was in all hos-

pitals. I then endeavored to point out how much of the reduction was due to the Brand method, and I think I showed it to be about 2.5 per cent.

My paper is not intended as a destructive agent. As Dr. Osler has said, statistics can be so used as to mean anything; but I would like to say that, though I have been accustomed to working in statistics, I have not been able to find out how Dr. Osler reached some of his conclusions, although I have read the *Johns Hopkins Hospital Reports* very carefully. In one place the percentage of hemorrhages and relapses is given, and somewhere else in the report we find that all the cases from which these percentages were obtained were not bathed. I do not mean to be disrespectful in this matter, and it may be that my stupidity has got the better of me, but if my statistics are not reliable, "let him that is without sin first cast the stone." Some of the statistics which have been offered and which seem to support Dr. Osler's statement as to mortality are not valuable. One statement is to the effect that out of forty-four cases of typhoid fever the mortality was less than 2 per cent.; out of ninety cases the mortality was 16 per cent., and by adding these two together a mortality is shown of 8 per cent., whereas, as a matter of fact, it would be nearer 10 or 12 per cent. If these statistics are examined several flaws will be found. Those who deny the fact that relapses are increased—and I hope they will pardon me for saying so—do not know what the hydrotherapeutists admit. Brand himself admits that relapses are more common. I do not deny that hydrotherapy is the best treatment. If sponging is used, you must employ the proper technique. Brand asserts that unless you do it according to his formula you are not using the Brand treatment, and you will not get the good results that he gets. As an illustration that many persons do not know all the necessary details of the various forms of hydrotherapy, I would like to read that portion of my paper which, as it is in a footnote, I have not as yet read. [See footnote on so-called cold pack.]

It is difficult to collect statistics on this subject. Dr. Osler is one of the few who have had a sufficient number of cases to justify him in advocating that this plan of treatment should be followed in all instances. I would like to know if Dr. Osler includes in his statistics all cases treated in the wards, or excludes all those which come into the hospital moribund and otherwise so ill that they cannot be bathed, as this is very important. If he does not include these the statistics would show an entirely different state of affairs.

Personally I only indulged in three tub baths. The peculiarity in my case was that I was perfectly clear in my mind, and I can bear witness to the misery of being put into a tub, and it is, to my mind, the worst experience one can conceive of. The nurse had to hold my head up while whiskey was poured down my throat. In hospital practice physicians can use the cold-bath treatment, but they modify it considerably in private practice, and especially in their own families. This very treatment, as Dr. Meigs

has said it is, is what Dr. Wood used to call "kangaroo therapeutics," in that the effects are reached in fits and starts. I do not think there is so much kangaroo effect by sponging. We are told that hemorrhages contra-indicate the cold bath, but it is still necessary to control the temperature. The physician, therefore, begins to sponge, and deaths which may follow are not classed as deaths under the bath. When I can clear the mind and quiet the pulse and reduce the fever, I am satisfied with sponging; but when I cannot do this, I resort to plunging.

The whole object of the paper is to bring forward the thought as to what is the best method of treating typhoid fever. With regard to the patient stepping into the tub, those who are familiar with the literature on the subject know that this is freely allowed by many men. A relapse is not a recrudescence. One cannot compare old statistics with the new. If there has been this enormous decrease in the mortality, you must compare the cases year by year. The Brand advocates in Germany assert that the reduction of the temperature is not what they seek, but they seek reaction. I saw Dr. Baruch the other day, and I told him about this paper. He stated that his object was not to reduce the temperature so much as to get reaction.

If Dr. Wood was familiar with the hydrotherapeutic literature of the last twenty years he would recognize that my ingenious "fairy tales" are not mine. What I have said has been taken from the writings of men who have written on this topic after having examined the urine, blood, and arterial pressure by scientific methods. I do not wish to lay claim to any originality as to the physiological effects of hydrotherapy. My sole object is to ask whether the routine use of the bath is wise.

A CASE OF FILARIA SANGUINIS HOMINIS.

By THOMAS D. DUNN, M.D.

[Read March 2, 1898.]

M. W., aged nineteen years, white female, single, of German parentage, was born in Philadelphia. Her father died at the age of fifty-two years from abscess of liver; mother still living, health poor, the result of overwork; has six living sisters and one brother, who are healthy. One sister died of pneumonia at ten years of age. Always lived in Philadelphia until 1895, when she went to Altoona, Pa., returning November, 1896. No history of venereal disease. At the age of fifteen years she had scarlet fever, but had had no other serious disease prior to this, and had always enjoyed good health previous to February 9, 1897. She was then taken with severe headache, fever, nausea, and vomiting, marked stomachic pain and soreness; bowels constipated, also severe pain in back. No urine passed for forty-eight hours. She thinks the color of urine first voided was natural, but is not certain, and had further trouble as to suppression, but while quite well she lost some flesh, and was not so strong as usual.

Sunday evening, August 1, 1897, she was taken with a similar attack of headache and backache, nausea and vomiting, abdominal pain and soreness, but with a tendency to looseness of the bowels, instead of constipation, as in former attack. Voided urine at 3 P.M. naturally, and then not until Wednesday morning, August 4th, an interval of sixty-four hours.

I first saw her at my office Monday evening, August 2d. She presented the symptoms previously stated; temperature 102° F.; pulse 112; abdomen sore; pressure over kidneys gave pain, but there was no evidence of undue distention of bladder.

She was ordered to bed, with hot fomentations over abdomen and back, and five grains of citrate of potassium with one-third teaspoonful of sweet spirits of nitre, to be given in lemonade, every two hours, also five grains of phenacetin as required for headache. On Tuesday evening there was no material change, with the exception of less pain and fever, the result of phenacetin.

The following morning I was sent a pint of milky urine, which had a decided layer of fat on the surface and sides of the bottle, which readily

cleared with ether. Slight tendency to coagulation in the bottom at first, which ceased when the urine began to ferment. There was a very faint pinkish tinge to a small sediment, which also soon disappeared. Odor was offensive; reaction alkaline; specific gravity 1024; decidedly albuminous. The microscope showed red blood-cells, also white cells, which were probably lymph-cells, oil globules, and many embryonic filariæ.

A quantitative estimation of fat by Professor Cochran showed 2.2 per cent. The second passage, a few hours afterward, was nearly free of the chylous character, and, though scanty and passed infrequently, the urine was clear and natural. The hot weather and an active skin supplemented the urinary secretion. All acute symptoms subsided at once, although there remained some loss of flesh and strength, with decided pallor. Under a nutritious and liberal diet and iron tonic, there was improvement in her general condition until Sunday evening, August 29th, when she had another attack of headache and backache, stomach soreness, and pain passing through to back. Pulse 108; temperature 101° F.; slight swelling of hands and feet, with puffiness of face. Urine voided at 4 P.M., August 29th, then none until September 2d at 3 P.M., which was chylous, and had the same deposit as former specimens, but had a thinner scum of fat on standing. When the urine started the general symptoms at once disappeared, and the urine was entirely clear on the following day. She was again put on a tonic of iron, arsenic, quinine, and strychnine, and a liberal diet. She passed from under my care September 10th, and I have only heard that, though somewhat debilitated, she has had no return of the trouble.

August 10th, at 11 P.M., the patient having had a quiet evening, I examined the blood and found several active embryonic filariæ, length about one-eightieth of an inch and the width of a red corpuscle. The blood-count showed 4,181,093 red corpuscles to the cubic millimetre, and one white to 350 red; hæmoglobin about 75 per cent.

On September 5th, after the second attack of suppression, I made another blood examination, but did not find the parasite. It was made, however, at 9 P.M., immediately after an active afternoon and evening. This seems to support the observation of Stephen Mackenzie, that if the habits of the patient are changed and he is active at night, sleeping during the day, the periodicity is reversed.

Two varieties of chyluria have been recognized—one non-parasitic, the result of some abnormal communication between the lacteal and lymphatic channels with some part of the urinary tract; the other parasitic, in which the filaria sanguinis hominis has a definite causal relationship.

How and where the communication between the urinary and lymphatic systems is established is, as yet, not known. Dr. Van-

dyke Carter, in 1861, advocated the first view, and that diseases allied to chyluria, such as elephantiasis, lymph-scrotum, lymph-hydrocele, etc., are due to communications between dilated lymphatics and the surface.

In 1866 Wucherer, of Bahia, discovered the embryo of filaria in active motion in chyluria. In 1870 Dr. Lewis, of Calcutta, discovered, independent of Wucherer's discovery, the nematode worm of chylous urine, and in 1872 he found the parasite in the blood of a chyluric patient—a Hindoo.

Dr. Bancroft, in 1876, discovered in a lymphatic abscess of the arm a dead parent parasite, and Dr. Lewis, in 1877, found two living parent worms—male and female—in a case of nevoid elephantiasis of the scrotum.

In 1880 Dr. Manson, of Amoy, discovered the parent worm, a mature female, in a lymph-scrotum. He thus describes it: "A long, slender, hair-like animal, quite three inches in length, but only one one-hundredth of an inch in breadth, of an opaline appearance, looking, as it lies in the tissues, like a delicate thread of catgut, animated and wriggling. A narrow alimentary canal runs from the simple club-like head to within a short distance of the tail, the remainder of the body being almost entirely occupied by the reproductive organs. The vagina opens about one twenty-fifth of an inch from the head; it is very short, and bifurcates into two uterine horns, which, stuffed with embryos in all stages of development, run back and nearly to the tail." The male worm is much smaller and much less frequently seen. The female produces an extraordinary number of embryos in her habitat—a lymphatic duct—which enter the blood through the lymphatic channels. The embryo is in a shell, which is elongated and scarcely perceptible, and in no way impedes its movements. They are about one ninetieth of an inch in length, and in width the diameter of a red blood-corpuscle. In an autopsy on a chylous patient, Dr. Mackenzie found dilated lymphatics and the thoracic duct plugged with embryos, which caused the accidental communication between the chyle-bearing vessels and the urinary tract.

In 1878 Bancroft and Manson discovered the embryo in the stomach of a female mosquito, which acted as an intermediary

host. The mosquito attacks the filarial patient at night, and gorges herself with blood, and then deposits the ova in water. The human subject drinks the water and the embryo penetrates the lymphatic system, there develops into sexual maturity, and produces myriads of embryos.

Dr. Lewis, of Calcutta, found in his servant's house, in eight mosquitoes caught at random, four had embryos of filariæ.

The periodicity in which the embryos are found in the blood is very remarkable. During the day they are almost entirely absent, but are found usually at night, when the individual is asleep.

Dr. Mackenzie, as stated before, found if the habits are changed, the patient working at night and sleeping during the day, their activity was reversed. It is not known where they are concealed during the day.

Dr. Osler records a case of chyluria, in which no filariæ were found, which lasted thirteen years. He believes there is a non-parasitic variety of the disease, but offers no explanation. Lymphatic tumors, lymph-scrotum, in fact the lymphatic system in any part of the body, may be plugged by the embryos. The disease is rare in this climate, and the few cases that are seen in a temperate climate are mostly contracted where it is endemic, as in the East and West Indies, China, Brazil, Cuba, Bermuda, and Australia. Many districts of these countries enjoy a complete immunity, while Manson found in his researches at Amoy that one out of every ten Chinamen taken at random had filariæ in his blood. It depends entirely upon the distribution of the filariæ. A few patients have contracted the disease who have never travelled; such cases may be explained by the fact that mosquitoes may have been brought to our shores by vessels trading with tropical countries. Such is the probable explanation of the disease in the case reported above.

DISCUSSION.

Dr. F. P. Henry: The paper seems to assume that there is only one variety of filaria. There does not seem to have been a sufficient number of examinations made in this case to determine the species present. It may be the filaria nocturna, and it may not.

THE CONSERVATIVE TREATMENT OF PELVIC SUPPURATION OF PUERPERAL ORIGIN.

By CHARLES P. NOBLE, M.D.,
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[Read April 6, 1898.]

Pelvic inflammation and suppuration of puerperal origin has certain marked peculiarities which distinguish it from inflammation in the non-puerperal state. Bernutz, by post-mortem examinations, and later Tait and his disciples, by abdominal section, clearly showed that pelvic inflammation in non-puerperal patients originates as an infection of the vagina or endometrium, and that the inflammation spreads thence to the Fallopian tubes and to the peritoneum. In such cases pelvic suppuration consists of pyosalpinx, abscess of the ovary, intraperitoneal collections of pus, and, in rare instances, secondary abscesses in the cellular tissue. In puerperal cases the course of the inflammation in many cases is the same; in many others, however, the infection spreads from the endometrium, or from infected wounds of the vagina or cervix, along the lymphatics to the connective tissue of the broad ligaments, and gives rise to an acute cellulitis or lymphangitis. In certain cases the inflammation spreads along both routes of invasion. In still other cases infection spreads along the venous channels, giving rise to local phlebitis or to general septic infection. These elementary pathologic facts are now generally recognized, although some years ago they were sharply controverted, more especially by the disciples of Tait. My own attention was drawn to this subject very early in my professional work by seeing two cases of puerperal abscess in which abdominal section demon-

strated that the Fallopian tubes were healthy, but that abscesses were present in the pelvic cellular tissue, which were evacuated in each case by a second extraperitoneal incision. This experience led me to a very careful study of all cases of puerperal pelvic inflammation which came under my care, and from time to time I reported cases of true pelvic abscess to the Philadelphia Obstetrical Society, in a large percentage of which the diagnosis was established by abdominal section as a preliminary to the evacuation of the pus. When these reports were made, their correctness was disputed by many gynecologists who are now in full accord with this view of pelvic inflammation in puerperal patients.[1] In the last communication which I made on this subject,[2] I reported twenty one cases of puerperal pelvic cellulitis and true pelvic abscess, in which the diagnosis was confirmed by cœliotomy; six of these cases were seen by myself, and fifteen of them were communicated by well-known abdominal surgeons throughout the country.

The primary purpose of the communications to which reference has been made was to establish the fact that in puerperal cases acute cellulitis and true pelvic abscess are met with. The object of the present communication is to consider the conservative treatment of these conditions. The diagnosis of the exact site of pelvic inflammation and suppuration is difficult, and this fact led to the performance of an unnecessary cœliotomy in a number of the early cases which will be reported. These exploratory cœliotomies served to establish the existence of cellulitis or abscess; but at the same time showed that abdominal section is unnecessary for the cure of such cases. Cœliotomy was employed to settle the diagnosis definitely, probably under the influence of the current belief that pus in the pelvis almost invariably is in the appendages or is intraperitoneal.

The differential diagnosis between pelvic cellulitis and pus-

1 "Four Cases of True Pelvic Abscess," Medical News, August 29, 1891; "Case of True Pelvic Abscess," Annals of Gynecology and Pediatrics, January, 1893; "Case of Puerperal Cellulitis," Gaillard's Medical Journal, April, 1894; "Puerperal Pelvic Cellulitis and Puerperal Peritonitis," American Gynecological and Obstetrical Journal, January, 1895.

2 "Puerperal Pelvic Cellulitis and Puerperal Peritonitis," American Gynecological and Obstetrical Journal, January, 1895.

tubes or intraperitoneal abscess is difficult, but there are certain diagnostic marks which will either establish the diagnosis or at least prevent the practitioner from going astray in his treatment. The general course of a cellulitis is milder than a peritonitis. There is less tympany and bowel-disturbance. In other words, the inflammatory process is more distinctly localized. On examination the inflammatory mass is distinctly contiguous to the vaginal wall, and if large and unilateral it displaces the uterus to the opposite side. As a rule, it is evident that the inflammatory mass is more distinctly in relation with the bony wall of the pelvis than is the case with diseased appendages. These leading characteristics serve to establish a diagnosis of cellulitis or true pelvic abscess, or to make it highly probable. In certain cases the diagnosis will be uncertain, for the excellent reason that the case is complicated by the existence of salpingitis and peritonitis.

In each of the cases embodied in this report, a satisfactory recovery followed the use of incision and drainage. Incision from the most accessible point, preferably through the vagina, is the only rational treatment for cases of extraperitoneal pelvic abscess. To open the general peritoneal cavity in order to evacuate the abscess is not only irrational, but very greatly increases the risk of the operation. The inflammatory process in all these cases is recent, and there is every reason to believe that the invading germs still maintain their virulence, although exact bacteriologic researches upon this point are not available. The risks of septic peritonitis from such a method of treatment are apparent, and in addition to this is the disadvantage that the employment of drainage, especially of the large gauze drain through the abdominal incision, in a large percentage of cases leads to the subsequent development of ventral hernia.

The following cases are reported to illustrate various forms of puerperal inflammation and the results of treatment by operation.

Case I.—Mrs. F. was operated upon by Dr. Daniel Longaker, assisted by Dr. Parish and myself, May 9, 1888. She was delivered after a normal labor of her third child seven weeks previously under the care of Dr. Peltz. On the fifth day septic symptoms appeared, which persisted until the date of operation. She presented the typical evidences of long-continued septic

absorption. A large mass could be made out in the left broad ligament, extending over to the right in front of the cervix, and also distinctly palpable from above in the left groin, extending as high as the crest of the ileum. At my suggestion a median abdominal section was made; some recent peritoneal adhesions were found; but the ovaries and tubes were palpated and found to be in good condition. The mass was distinctly extraperitoneal. A second incision was made above Poupart's ligament, and about eight ounces of pus evacuated. The abscess was located in the left broad ligament, and extended between the uterus and bladder into the right broad ligament. Mrs. F. made a tedious but good recovery, and five years later was in good health. She had no more children, but her sterility was designed.

Case II.—This patient was operated upon by the late Dr. Charles Meigs Wilson, assisted by myself, in the fall of 1888. Labor was followed by septic inflammation, which resulted in the formation of a phlegmon easily palpable from both the abdomen and vagina, and tending to point in the right groin. Abdominal section was done to settle the diagnosis, which demonstrated that the abscess was extraperitoneal, and that the Fallopian tubes were not involved. The pus was evacuated by an incision in the groin. The patient made a good recovery from the operation, but her subsequent history is unknown.

Case III.—Mrs. M. was seen in consultation with Dr. Himmelwright, March 22, 1890. She had a miscarriage January 3d, at the second month of pregnancy. One week later pelvic inflammation appeared, and a diagnosis of peritonitis was made. The patient improved, and was out of bed February 1. A week later relapse occurred, with marked pain in the right inguinal region, which increased in intensity and extended to the lumbar region. On February 27th a swelling was noticed in the right lumbar region. On March 3d the mass filled the right half of the abdomen from the pelvis to the ribs, and distinctly pointed in the lumbar region. A lumbar incision was made, and at least a quart of pus was evacuated. Exploration with the finger showed that the abscess was extraperitoneal. The patient made a prompt recovery from the operation, and subsequent examination showed that the pelvic organs were in good condition. Dr. Himmelwright writes me under date of February 14, 1898, that Mrs. M. continues in good health, is a hearty, robust woman, doing her full share of housework and riding the bicycle for exercise. She has had one child, now four years of age, and a number of miscarriages since the operation.

Case IV.—Mrs. T., aged sixteen years, was seen in consultation with Dr. Langrehr on March 15, 1891, five weeks after her first labor. Septic pelvic inflammation followed labor. The patient was very sick for three weeks, her temperature ranging between 100° and 103° F. During the fourth week the symptoms abated, but recurred at the beginning of the fifth week. When I saw her she was very feeble, and presented the typical

evidences of long-continued septic absorption. On examination a mass was found in the left broad ligament extending between the uterus and bladder, and distinctly palpable above the pubes. A diagnosis of true pelvic abscess was made. Abdominal section was done the following day by Dr. Langrehr, who found that the uterine appendages were not involved. The omentum was adherent to the broad ligament. About six ounces of pus were evacuated by an incision in the left inguinal region. The patient made a good recovery. Under date of February 10, 1898, Dr. Langrehr writes me that Mrs. T. has continued well since the operation, and has since given birth to "healthy children."[1]

Case V.—Mrs. H., aged twenty-eight years, a secundipara, was delivered of her second child in March, 1891, the labor being conducted by a midwife. She was infected, and subsequently was extremely ill. I saw her with Dr. Leopold five weeks after labor. At that time she was greatly prostrated, and presented the classical symptoms of septic intoxication. On examination the right broad ligament was found indurated, and a mass of exudate extended on the right side of the abdomen almost as high as the umbilicus. From the extent of the mass it was supposed that a right pyosalpinx with an intraperitoneal abscess existed. A median abdominal incision was made April 16th, and the abdominal viscera and the lower right quarter of the abdomen were found fused by adhesions. She took ether so badly that it was necessary to abandon the operation to avoid a fatal result from the anæsthesia. Some days later operation was attempted with chloroform as the anæsthetic. Anæsthesia was abandoned, as the chloroform produced as marked cyanosis as the ether had done in the previous operation. Without anæsthesia an incision was made directly over the broad ligament. The uterus was located, and the index-finger was forced into the broad ligament, evacuating several ounces of pus. The patient made a good recovery. On October 27, 1892, Mrs. H. was operated upon for the cure of a ventral hernia, which had formed at the site of the drainage incision. On opening the abdomen it was interesting to observe that the adhesions throughout the right side of the abdomen, which had been universal eighteen months previously, had entirely disappeared, except a point of adhesion between the omentum and hernial sac, and another between the omentum and broad ligament. Both appendages were perfectly healthy. This fact demonstrated what was inferred when the pus was evacuated, namely, that the case was one of true pelvic abscess, and not a pyosalpinx. The disappearance of the very extensive adhesions is worthy of record as showing that peritoneal adhesions are not necessarily permanent. This case was reported in full to the Philadelphia Obstetrical Society, December 3, 1892. Mrs. H. made a good recovery, and subsequently was delivered of a living child a year and a half after operation.

[1] The first four cases were reported in the Medical News, August 29, 1891.

Dr. Leopold writes me that when last heard from, in 1897, she continued well.

Case VI.—This patient was seen in consultation with Dr. Dunn, of West Chester, May 1, 1894. Her last child was born March 27th, and in the mean time she had suffered from a mild but persistent septic infection, which had resulted in the formation of a large pelvic abscess. The pus had burrowed along the inguinal canal and was pointing in the groin. The patient was extremely feeble from long-continued sepsis. Owing to my previous experience with this class of cases, the treatment consisted in a direct incision into the groin with evacuation of the pus. A thoroughly satisfactory but tedious convalescence resulted. Dr. Dunn writes me, February 10, 1898, that this patient has continued well since the operation, and two years after the operation she gave birth to twins. She has no symptoms dependent upon the former pelvic trouble.

Case VII.—Mrs. B., a secundipara, was delivered October 24, 1895, after a tedious and instrumental labor. About thirty-six hours after labor the patient became septic, and for the following eighteen days the temperature fluctuated between 99° and 100° F. in the morning, and 103° and 104° F. in the evening. I saw her on the eighteenth day in consultation with Dr. Cross, of Jenkintown. At that time a well-marked mass could be made out high up in the false pelvis and in the region of the cæcum. The diagnosis lay between appendicitis with an abscess and an abscess of puerperal origin. The absence of any history of foul-smelling discharge from the uterus, and the fact that the uterus and broad ligaments were not found abnormal, and especially that no exudate could be felt high up in the pelvis, inclined me to accept the diagnosis of appendicitis, which had been arrived at by Dr. Cross. Operation was advised, and on the following day a direct incision was made into the mass, evacuating a large amount of pus. Unfortunately, the ileum was adherent under the point of incision, and was opened for the distance of one-half inch, requiring suture. The patient promptly recovered from the operation, but the sinus did not close. On March 2, 1896, abdominal section was performed, and the cause of the persistence of the sinus was found to be a small right pyosalpinx. Mrs. B. made a good recovery, subsequently became pregnant, and miscarried June 5, 1897. This was a case of puerperal pyosalpinx with intraperitoneal abscess, and not a case of puerperal phlegmon. It is included here because incision and drainage rescued her from a very critical condition, in which a radical abdominal operation with removal of the affected tube would almost surely have resulted fatally.

Case VIII.—Mrs. L., aged twenty-eight years, a secundipara, was prematurely delivered November 20, 1895, by a midwife. On November 28th she had a chill, and subsequently developed an inflammation in the right inguinal region. She was seen December 7th by Dr. Stoner, who found her much prostrated, complaining of general abdominal pain, most marked

in the right iliac region. A small mass was detected upon pressure in the appendix region. Her temperature was 100° F., and her pulse 112. Under treatment the general condition improved, but the mass in the iliac region increased in size. December 11th I saw her with Dr. Stoner, and a very large mass in the appendix region was palpable. On this day the symptoms had become aggravated. An immediate operation was urged; consent was refused, but on the following day she was taken to the Kensington Hospital for Women. In the mean time her condition had become worse, her pulse was above 130, and the temperature 103° F. The peritonitis was evidently extending, and she had become decidedly septic. She was operated upon in the night. A direct incision was made over the mass, but adhesions had not formed between it and the abdominal wall. The general peritoneal cavity was packed off with gauze; the abscess was opened and the pus evacuated. The abscess extended well up toward the ribs. This patient recovered in spite of œdema of the lungs and acute nephritis. Her condition was such that had more been attempted than a drainage-operation, she would certainly have died. March 1, 1897, Mrs. L. was operated on a second time, because of the development of a hernia and the presence of a small tumor. A small right ovarian cystoma, an occluded right Fallopian tube, and an adherent vermiform appendix were found. It is difficult to say whether this was a case of intraperitoneal abscess from appendicitis or from salpingitis, but the probabilities are from the latter. She made a good recovery from the second operation.

Case IX.—Mrs. R., aged forty years, has had eight children and two miscarriages, the last one January 4, 1896, at the sixth week of pregnancy. The ovum was discharged after one day. She apparently had very little trouble, and was out of bed on the tenth day. About two weeks later she was seen by Dr. Walker. She had severe pain in the hypogastrium and later in the left groin. At no time had she fever, but had a persistently rapid pulse. I saw her with Dr. Walker on February 22d. Her pulse was 120 and temperature 101° F. A large mass was outlined between the uterus and bladder, extending into the left broad ligament, and in addition there was evidence of pus-formation under the skin in the left groin, the exudate extending well up the flank toward the ribs. The following day an incision was made in front of the cervix, the bladder was pushed off from the uterus, and the finger introduced into the abscess-cavity, which extended from slightly to the right of the cervix well over into the left broad ligament. About four ounces of pus were discharged. A second incision was made in the groin, and a large abscess evacuated. The pus in this location had evidently burrowed along the round ligament, and was external to the abdominal muscles. She made a very satisfactory recovery, and has since remained well.

Case X.—Mrs. B., aged twenty-eight years, was delivered December 18, 1895, at full term of her first child. Marked hydramnion existed, and

about two gallons of liquor amnii were discharged. The patient was delivered instrumentally by Dr. Robinson, under full antiseptic precautions. A poorly developed child was delivered alive, who died of convulsions after two days; forty-five minutes after delivery Mrs. B. had an attack of convulsions, which were very severe, and persisted in spite of active treatment, especially with veratrum viride. The patient improved so far as the convulsions were concerned, but was much dazed mentally, and soon developed decided mania. On the fifth day there was a slight chill, and a decided one on the twelfth day. The lochia was normal throughout. The patient continued to be very ill physically and did not improve mentally. The temperature in the afternoon ranged from 101° to 104° F. For a long time there was no tenderness or other indication of inflammatory processes about the pelvis, but after the sixteenth day the abdomen became tympanitic. On the sixty-third day a mass was recognized behind, above, and to the left of the uterus, but there was no complaint of tenderness. I saw Mrs. B., with Dr. Robinson, on February 21st, and advised operation, and on the 26th was able to reach the pus-sac by vaginal incision, introducing the fingers well up behind the uterus, and puncturing the sac with scissors. A large amount of very offensive pus was discharged. The sac and pelvis were irrigated, and a large gauze drain was introduced into the pelvis. Improvement was manifested at once. Within a week the mental condition was greatly improved, the insanity disappeared within two weeks, the temperature became normal after five days and remained so. The patient has since continued well, and is at the present time well advanced in pregnancy. The nature of the pus-sac was not discovered.

Case XI.—Mrs. A., aged twenty-eight years, was delivered of her third child after a normal labor, the child being born before the arrival of the attending physician, Dr. Kerr, of Downingtown. She did well with the exception of contracting a tonsillitis on the fifth day. On the tenth day her throat was well, and she left her bed. Dr. Kerr saw her again on the nineteenth day, when she had a chill, with a temperature of 104° F., with pain in the right side of the abdomen. Prior to this time she had been at work, but for two days had complained that her foot and leg felt heavy. Two days later a swelling appeared in the right groin, and she continued to have an irregular temperature until the thirty-first day, when I saw her in consultation. A large exudate was present in the right half of the pelvis, and there was some phlebitis in the right leg. I considered the mass clearly a cellulitis and phlebitis, as distinguished from an intraperitoneal exudate. The persistence of the fever and the extent and density of the exudate made a diagnosis of abscess extremely probable. Operation was advised, and three days later, at the Chester County Hospital, a vaginal incision was made, and the mass of exudate was penetrated with the fingers almost to the bifurcation of the iliac artery, but no pus was found. The operation had a distinctly beneficial effect upon the exudate, as the fever promptly

subsided, and the exudate was rapidly absorbed. The patient made a good recovery, and has since remained well. Dr. Kerr writes me, February 18, 1898, that Mrs. A. is quite well. She has had no children since the operation, and says "she does not expect to."

Case XII.—Mrs. R. was seen, with Dr. Riesman, some weeks after labor. She had a mild septic fever, which had persisted in spite of the usual methods of treatment. When I saw her there was a distinct exudate in the left broad ligament, and also an adherent ovary and tube upon that side. The mass of exudate appeared to be due to a cellulitis, but it was not possible to exclude a complicating salpingitis. As the fever persisted and the exudate increased rather than diminished, an incision was made from the vagina, and the mass of exudate freely opened up with the fingers without reaching any pus. In this case, also, the effect of the operation was distinctly beneficial, as the fever soon disappeared and the exudate was gradually absorbed. When I last heard from the patient, some months after her discharge, she was enjoying good health.

Case XIII.—Mrs. B., aged twenty-two years, has had two children and one miscarriage. The last labor was January 3, 1897, when she was delivered of a dead baby. She did not have a good "getting up," but gave no history of an acute septic infection. She complained of pain in the pelvis and some bleeding, until April 20th, when she presented herself at the dispensary of the Kensington Hospital for Women. She was admitted to the hospital on May 4th, at which time she had a temperature of 101° F., and, on examination, a mass was found to the left of the uterus, which I believed to be an extra-peritoneal abscess. A vaginal incision was made, the abscess opened, drained, and packed with gauze. Recovery promptly ensued, and the patient returned home. She was instructed to report to the dispensary for tampon treatment, and received this regularly until her readmission to the hospital, November 19th. During this time her general health improved very much, and, excepting when she exerted herself, she felt comfortable. If she was obliged to do hard work, however, she suffered from pelvic pain. On her readmission to the hospital it was evident that there were some adhesions holding the uterus in retroversion. The uterus was curetted, a laceration of the cervix sewed up, and then the abdomen was opened. The interesting point, of course, is as to the condition of the uterine appendages in the case. It will be recalled that the abscess was to the left of the uterus. Both appendages were found lightly adherent, but the Fallopian tubes were patulous, and, aside from the adhesions, in normal condition. The left tube was more nearly normal than the right. This fact indicates the correctness of the original diagnosis, that the pus was extra-tubal. The steps of the abdominal operation consisted in freeing the adhesions and in shortening the round ligaments according to the technique of Mann. The patient made a good recovery. The case is an admirable illustration of the value of drainage for puerperal abscess.

Two other cases will be referred to, not because they were treated by incision, but because this method of treatment would have been better than that employed:

Case XIV.[1]—Mrs. F., aged eighteen years, was delivered of her first child May 8, 1893. She had a mild puerperal sepsis, and was in bed for two weeks. The following month she was constantly sick, being in and out of bed with mild septic symptoms. She came under my care six weeks after labor. Examination showed a large inflammatory mass in the pelvis, absolutely anchored to the left pelvic wall. The temperature fluctuated between 99° and 102° F., with the general evidences of mild septic absorption. An abdominal section was made June 26, 1893. The following conditions were found: The uterus was fairly well involuted, and was displaced upward and backward by a mass in the left broad ligament. The right broad ligament and the right Fallopian tube and ovary were entirely normal, as was demonstrated not only by touch, but by delivering the ovary and tube through the abdominal incision. The omentum was adherent to the anterior and upper border of the left broad ligament in front of the Fallopian tube. The left ovary and tube were found to be entirely normal, the mesosalpinx being normal, soft, and movable. This was demonstrated by touch and by vision, the woman being in the Trendelenburg posture. The left broad ligament was much infiltrated and firmly anchored to the anterior and left bony wall of the pelvis. Fluctuation was not apparent. It was decided to close the abdomen, and if septic symptoms persisted to open the broad ligament from the vagina. The patient's convalescence was uninterrupted; within four weeks the pelvic mass had almost entirely disappeared. On January 9, 1894, she consulted me, and upon examination I found her to be between three and four months pregnant. A careful examination failed to show any evidences of the former pelvic cellulitis. This patient would probably have recovered had no operation been done. Her recovery would undoubtedly have been hastened had the left broad ligament been incised early in the course of the inflammation.

Case XV.—The second case was that of Mrs. C., aged twenty-three years, who was infected in her third labor, and was very ill from puerperal septicæmia. I saw her in consultation with Dr. Bochroch, and found an extensive inflammatory mass in the right half of the pelvis. She was operated upon April 5, 1894. An abscess of the right broad ligament was found; to this the omentum was adherent, and a mass of fresh inflammatory exudate involved the middle portion of the Fallopian tube. The fimbriated extremity was not involved, and there was every reason to believe that the route of invasion was along the lymphatics to the broad ligament, the peritonitis being secondary to the cellulitis and broad ligament abscess. The operation consisted in the removal of the infiltrated portion of the omentum

[1] Gaillard's Medical Journal, April, 1894.

and of the right uterine appendage. The ligatures were passed through the suppurating broad ligament. A large gauze drain and a glass tube were used. Mrs. C. made a tedious recovery, which was complicated by a sinus, which did not close up until the pedicle ligatures were discharged. She eventually became well, and when last seen by me was seven months pregnant. In this case it would have been better had the broad ligament been incised from the vagina and the abscess drained. In this way the operation would have been rendered simple and safe, instead of most difficult and serious.

The experience gained in the management of the preceding cases has thoroughly convinced me of the efficacy of incision and drainage in the treatment of puerperal pelvic cellulitis and abscess. If the inflammatory trouble is limited to the broad ligament, a prompt cure results; if complicating peritonitis exists, the patient is put in a position to recover from the immediate attack, and should complications due to the peritonitis ensue, they can be dealt with later when the patient has recovered from her septic state and the conditions to be dealt with are relatively simple. The cases of large intraperitoneal abscess reported in this paper, together with many others, have convinced me of the wisdom of limiting surgical treatment in such cases to simple incision and drainage. Frequently, perfect recovery results, and, if not, a subsequent operation is much simpler and safer than a primary operation done under such unfavorable conditions. It is a great gain to eliminate such factors as a large pus-accumulation, prostration of the patient from septic absorption, the necessity for the use of drainage or gauze-packing, the immediate risks of septic peritonitis and the remote risks of ventral hernia, and to reduce the case to one of operation for pus-tubes or adherent appendages.

It is interesting to note that we have definite knowledge that the fifteen women have given birth to eight children, and that in addition several miscarriages and one pregnancy not yet terminated are known to have occurred. As several of the women have been lost sight of, and others have not been heard from for some time, it is probable that this does not represent the full number of pregnancies. One miscarriage and one pregnancy have followed operation in the five cases of puerperal pyosalpinx and intraperitoneal abscess; eight children and several miscarriages have followed in

the ten cases of pelvic cellulitis or true pelvic abscess. This is an interesting commentary on the view which was generally held some years ago, that pelvic suppuration was almost invariably the cause of permanent sterility. If other evidence was not available, the histories of these cases would be ample to show that pelvic suppuration is by no means a certain cause of sterility.

I wish to add to the legitimate conclusions of the paper a few remarks upon the best method of treatment of recent suppurative salpingitis of puerperal origin. It has been my practice in the past to operate by abdominal section and removal of the organs involved; but it is my intention in the future, whenever such tubes or pus-collections are situated low down in the pelvis, to employ vaginal incision and drainage. In the light of the relatively favorable results which have been secured by this method of treatment in the more chronic pus-collections, puerperal and non-puerperal, there is every reason to expect the most favorable results from early drainage, and that many women will not only be cured of the pelvic suppuration, but will be restored to health with intact pelvic organs. The basis for this belief is the well-known activity of the reparative processes of nature when pus is evacuated in recent inflammatory cases. I feel satisfied that a very large percentage of such patients will enjoy subsequent good health without the loss of their sexual organs, and that in a certain percentage of them the tubes will be restored to their integrity, and that even in this class of cases sterility will not be absolute.

OBSERVATIONS UPON THE TREATMENT OF ENTERIC FEVER BY SYSTEMATIC COLD BATHING, AS PRACTISED IN THE GERMAN HOSPITAL, PHILADELPHIA.

By J. C. WILSON, M.D.

[Read April 6, 1898.]

The object of this communication is, first, to present the statistics of the enteric-fever cases treated by systematic cold bathing from the time I introduced that method of treatment in the German Hospital, February 1, 1890, until January 1, 1898; second, to call attention to some modifications of Brand's original method which our experience has suggested.

The Statistics.

In previous publications[1] I have more or less fully reported the statistics of the subject to January 1, 1896, in the following series of cases:

1. February 1, to July 15, 1890, 40 cases, no deaths.
2. July 15, 1890, to February 1, 1891, 54 cases, one death; mortality, 1.8 per cent.
3. February 1 to June 1, 1891, 66 cases, 7 deaths; mortality, 10.6 per cent.
4. June 1, 1891, to June 1, 1892, 66 cases, 4 deaths; mortality, 6 per cent.
5. June 1, 1892, to June 1, 1893, 74 cases, 8 deaths; mortality, 10.8 per cent.
6. June 1, 1893, to October 1, 1894, 108 cases, 12 deaths; mortality, 11.1 per cent.

[1] Medical News, December 6, 1890. Ibid., November 26, 1892. Ibid., November 25, 1893. An American Text-Book of Applied Therapeutics, p. 240 et seq. American System of Practical Medicine, vol. i. p. 220.

7. October 1, 1894, to January 1, 1895, 27 cases, 5 deaths; mortality, 18.4 per cent.

8. January 1, 1895, to January 1, 1896, 89 cases, 1 death; mortality, 1.1 per cent.

I now add:

9. January 1, 1896, to January 1, 1897, 64 cases, 7 deaths; mortality, 10.9 per cent.

10. January 1, 1897, to January 1, 1898, 153 cases, 10 deaths; mortality, 6.5 per cent.

Total cases, 741; deaths, 55; mortality, 7.42 per cent.

A patient was admitted to the hospital on the afternoon of October 14, 1895, having been sick only a few days. He was suffering from convulsions. Temperature, 102.7° F. (39.3° C.). Death occurred the following morning. The anatomical diagnosis, based upon the intestinal lesions, together with enlargement of the spleen and of the mesenteric glands, was enteric fever. The clinical diagnosis was not made; the patient was not bathed, and the case is not included in Series 8. All other cases of enteric fever are included in the foregoing statistics. If the case referred to had been included the mortality would be 7.55 per cent.

For the purpose of comparison with Series 9, I append the statistics of three principal hospitals in Philadelphia for the year 1896: Episcopal, 153 cases, 13 deaths; mortality, 8.49 per cent. Pennsylvania, 149 cases, 15 deaths; mortality, 10.06 per cent. Presbyterian, 101 cases, 12 deaths; mortality, 11.88 per cent. Average mortality of 403 cases, 9.92 per cent.

In these institutions certain members of the staff treat the enteric-fever cases by systematic cold bathing, based upon the method of Brand; but this treatment is by no means general. It is impossible to state what proportion of the cases are treated by bathing and what upon other lines. At the time of writing I have not been able to procure the statistics from these institutions for the year 1897.

A further interesting and most impressive comparison is based upon the figures concerning the prevalence and mortality of enteric fever in Philadelphia, furnished by Dr. Taylor, of the Board of Health: 1896. Number of cases reported, 2490; deaths, 402;

mortality, 16.14 per cent. 1897. Number of cases reported, 2994; deaths, 401; mortality, 13.39 per cent.

It is important to note that these statistics include the very much more favorable series of cases reported by the great hospitals, in which cold bathing is to some extent, or, as in the German Hospital, altogether practised.

It has seemed to me better in this report to confine the comparative statistics to those of Philadelphia for the same periods of time. In this manner cases of the same endemic character, from the same population, and in general terms of the same hygienic conditions and manner of living, are compared.

The statistics of the Bureau of Registration are sometimes criticised by those to whose preconceived notions the high death-rate indicated does violence. It is assumed, and without doubt correctly, that deaths are reported as due to enteric fever which in point of fact are caused by other maladies. It may, however, be assumed with equal probability, that deaths are sometimes reported as due to other diseases, such as appendicitis, peritonitis, bronchopneumonia, etc., which in reality have been caused by enteric fever. Such errors are unavoidable, but do not constitute any noteworthy proportion of the cases, and must be regarded as offsetting each other.

Analysis of the Cases of Enteric Fever for the Year 1896.

Total number of cases, 64; number of deaths, 7; mortality, 10.9 per cent.; 41, or 64.1 per cent., were males; 23, or 35.9 per cent., were females. The average age was 24.8 years. Average day of disease on admission, 9.3. Average day of disease on which temperature became normal, 22.9. Average duration of patients' stay in hospital, 36.3 days. Intestinal hemorrhage occurred in 4 cases; 6.25 per cent. The number of cases in which hemorrhage occurred that recovered was 2; 3.5 per cent.

In the first case hemorrhage occurred on the fifth day of a relapse, the thirty-eighth day of disease. There were fifty-one small bloody stools, covering a period of five days. Five days later another hemorrhage, followed by five more on the three succeeding days.

In the second case hemorrhages numbering six occurred on the sixteenth and seventeenth days, followed by two on the twenty-second, one on the twenty-fifth and twenty-sixth, two each on the twenty-eighth, twenty-ninth, and thirtieth days.

Hemorrhage occurred in two of the seven fatal cases; 28.6 per cent. Relapse occurred in 12 cases; 18.8 per cent. No case of multiple relapse. Albumin occurred in 30 cases; 46.9 per cent. Nephritis (as demonstrated by albumin, erythrocytes, hyaline and granular casts, etc.) occurred in 12 cases; 18.7 per cent.

Phlebitis, suppurative otitis, and pleurisy each occurred in one case; 1.6 per cent. Average number of baths, 48.6.

Synopsis of Fatal Cases in 1896.

Case I.—O. H., male, aged twenty-two years; waiter. Admitted on fifth day of disease, with temperature of 102° F.; pulse 96. Spleen enlarged, but not tender. Abdominal tenderness and tympany; diarrhœa. Temperature range 103°–104° F. On the twenty-second day of disease four hemorrhages occurred; temperature fell to 101° F. On the four succeeding days there were twenty-four hemorrhages. Death on the twenty-seventh day of disease.

Case II.—U. K., male, aged thirty-one years; stenographer. Admitted on the sixth day of illness, with temperature of 104.3° F.; diarrhœa; pulse 114; spots. On the following day the temperature rose to 105.4° F. Death occurred on the second day after admission, on the eighth day of disease. Temperature 104.1° F.; no hemorrhage.

Post-mortem: Heart and lungs normal. Abdomen: Distention. Peritoneum plastic and slightly purulent. There were two perforations in ileum, one six, the other ten inches from ileo-cæcal valve.

Case III.—C. C., male, aged twenty-three; painter. Admitted on the fourteenth day of disease. Temperature 102° F.; pulse 100. Mentality sluggish, speech thick and slow; deafness; abdominal tympany; enlarged spleen; spots. Heart weak. Three days after admission extensive petechial rash developed over chest and abdomen. Patient exceedingly stupid. On the seventh day of admission, the twentieth day of disease, patient died. Temperature 102° F.; no hemorrhage. No post-mortem.

Case IV.—J. F., male, aged thirty-three years; leather worker. Admitted on tenth day of disease. Temperature 102° F.; abdominal tympany; spots; diarrhœa. Marked tenderness in right iliac fossa. Death eighth day after admission, on twentieth day of disease. No hemorrhage.

Post-mortem: Heart: Mitral valve thickened. Lungs normal. Abdomen: Intestines matted together with fibro-purulent exudate and a collection of pus in flanks and beneath the liver. Colon and small intestines

firmly bound together. The ileum within a half-metre of valve contained eight or nine ulcerations of clean, punched-out character, extending to serous coat, but without perforation. Empyema of gall-bladder.

Case V.—A. F., female, aged twenty-six years; houseworker. Admitted on tenth day of illness; temperature 103° F.; pulse 112. Heart-sounds weak. Seven days after admission, on the eighteenth day of disease, two small hemorrhages occurred. Four days later six hemorrhages, temperature falling to normal. The same day the temperature rose to 102° F., and steadily increased for five days, when it reached 106° F., the case terminating in death.

Post-mortem: Gaseous distention of abdomen; acute degeneration of heart-muscle. Lungs: Hypostatic congestion of both bases; small tubercular nodules at both apices. Gall-bladder filled with gelatinous, purulent material; one gallstone. Typhoid ulcers in ileum and cæcum. Region of ileo-cæcal valve riddled with mass of ulcers; no perforation.

Case VI.—E. V., female, aged fourteen years; servant. Admitted with temperature of 100° F.; pulse 120. Day of disease unknown. Marked delirium; abdomen distended; spots. Two days after admission temperature rose to 103.2° F. Patient died on the fourth day.

Case VII.—J. D., male, aged twenty-nine years; fireman. Admitted on the twelfth day, with a temperature of 106° F.; pulse 120; marked delirium; carphologia; abdominal tympany; enlarged spleen; spots. Consolidation at both bases. Temperature fell the following day to 103.2° F., thereafter fluctuating between 103° and 105° F. On sixth day after admission, on the eighteenth day of disease, the pulse became very weak, and the following day was uncountable. Temperature 104.4° F., death ensuing. No hemorrhage.

Post-mortem: Old tubercle at right and left apex; no apparent change in the heart; liver normal. Kidney showed interstitial nephritis. Eleven large ulcers in ileum. No perforation.

Analysis of the Cases of Enteric Fever for the Year 1897.

Total number of cases treated, 153; number of deaths, 10; mortality, 6.5 per cent.; 91, or 59.5 per cent., were males; 62, or 40.5 per cent., were females. The average age of the patients was 23.4 years. Average day of disease on admission, 8.2. Average day of disease when the temperature became normal, 22.7. Average length of stay in the hospital, 35.2 days.

Intestinal hemorrhage occurred in thirteen cases, 8.5 per cent. Hemorrhage occurred in ten of the 143 recovered cases, or 7 per cent. Hemorrhage occurred in three of the ten fatal cases, or 30 per cent. Relapse occurred in 29 cases, 18.9 per cent. Multiple

relapse in 2 cases, 1.3 per cent.; in each instance two relapses. No relapse occurred among the fatal cases. Average duration of relapse, 13.4 days. Albumin occurred in 59 cases, 38.5 per cent. Nephritis (determined by erythrocytes, albumin, hyaline, granular, and epithelial casts) occurred in 44 cases, 28.7 per cent. Average number of baths, 51.3. Crural phlebitis occurred in 3 cases, 1.9 per cent. Suppurative otitis media occurred in 2 cases, 1.3 per cent. Sciatica in one case, 0.6 per cent. Rheumatism (acute) in one case, 0.6 per cent. This complication developed during the period of incubation of the enteric fever.

Mortality for 1896 and 1897, taking Series 9 and 10 together, 217 cases, 17 deaths, 7.8 per cent.

Summary of the Fatal Cases in 1897.

Case I.—J. S., male, aged thirty-eight years; pipe-fitter. Admitted on the twelfth day of illness. Temperature 103.3° F.; pulse 116. Delirium; diarrhœa; cardiac area increased; abdomen distended and tympanitic; spots; spleen enlarged. Three days after admission temperature rose to 104° F.; pulse 144. Death occurred on the same day, the fifteenth day of illness. No hemorrhage.

A complete *post-mortem* could not be made. Lungs normal, save some hypostatic congestion. Pericardial sac contained much fluid and serofibrinous exudate. The heart was not opened.

Liver and spleen enlarged. Kidneys were congested. Small intestines congested. Peyer's patches were found enlarged and broken down, extending through to serous coat. No perforation.

Case II.—F. K., male, aged twenty-eight years. Admitted at end of third week, with temperature of 102° F.; pulse 98. Marked stupor; abdomen tympanitic and tender; spleen enlarged and tender; spots. On day after admission small hemorrhage. Three days after admission the temperature rose to 104° F., gradually declining to normal. Death occurred four days later. Nephritis.

Post-mortem: Thorax: Heart normal; no embolus in coronary artery. Lungs crepitant throughout. Abdomen: Organs in normal position; areas of slight congestion along ileum and large bowel. Appendix normal; liver normal; spleen large and slightly congested; kidneys anæmic and apparently undergoing change.

Pathological cause of death not found. Cerebral embolism?

Case III.—A. U., male, aged twenty-six years; laborer. Admitted on tenth day of disease. Temperature 102.2° F.; pulse 98. Heart and lungs clear; spleen enlarged. On sixteenth day of disease temperature 99° F.,

the next day rising to 103° F. Death on the following day. Marked nephritis.

Post-mortem: Lungs normal, save slight hypostatic congestion; heart normal. Appendix had a constriction, with fecal concretion in tip. Liver somewhat congested. Kidney apparently normal. Intestines were congested and contained thirty-seven ulcers, three of which were exceedingly large and deep. No perforation.

Case IV.—U. H., male, aged twenty-four years; laborer. Admitted on eighth day. Temperature 101.3° F.; pulse 88; heart-sounds enfeebled. Impaired resonance at left lower lobe; broncho-vesicular breathing throughout. Spleen enlarged; abdomen distended. Two days after admission the temperature rose to 103.3° F. Slight hemorrhage, death ensuing. Nephritis.

Post-mortem: Both lungs showed evidence of acute bronchitis with hypostatic congestion of lower lobes. Heart normal. Liver enlarged, and very firm to touch. Spleen greatly enlarged. Kidneys normal. Ileum and ascending colon deeply congested. Section revealed the ileum covered with many superficial oval ulcers covered with necrotic tissue.

Case V.—M. J., female, aged twenty-five years; housewife. Admitted on seventh day, with a temperature of 103° F.; pulse 114. Abdomen distended; spleen enlarged. Temperature range 103–105° F. On seventh day after admission, the fourteenth day of illness, symptoms of perforation developed. The temperature fell three degrees, pulse feeble. Hard, distended abdomen. No hemorrhage. Nephritis. Death.

Post-mortem: Heart and lungs normal. Intestines deeply congested in areas. Perforation at ileo-cæcal junction. The lower three feet of ileum presented a number of deeply congested and sloughing ulcers, some of which were nearly perforating. Liver enlarged and congested. Spleen large, dark, and soft.

Case VI.—E. M., female, aged sixteen years; housewife. Admitted on seventh day of illness. Temperature 103° F.; pulse 124. Temperature fell to normal on twentieth day of disease; remained normal for five days, then gradually rose to 105° F., remaining at 104° or 105° F. for five days. On the thirtieth day the patient had four hemorrhages, followed by a hemorrhage on the three succeeding days. On the thirty-third day the temperature fell to 100° F., followed by death. Nephritis. No post-mortem.

Case VII.—E. G., female, aged twenty-one years; housewife. Admitted on or about the fourteenth day. Had been severely overworked. Delirious on admission. Spleen enlarged; no spots. Heart and lungs clear. Twenty-four hours after admission delirium increased; patient passed several ascarides lumbricoides. Became rigid nearly to opisthotonus. Three days after admission the temperature rose to 105° F. Decided congestion of the right lung. Patient died twelve days after admission, about the twenty-sixth of the disease. No hemorrhage.

Post-mortem: Heart normal, filled with chicken-fat clots. Lungs normal, save congestion of right lower lobe. Liver somewhat soft; otherwise normal. Kidneys apparently normal. Intestines much congested over areas of Peyer's patches. Head of cæcum contained four round worms. Areas of congestion over large bowel. Vessels of brain much congested. **No pathological diagnosis given.**

Case VIII.—M. W., female, aged forty-five years; houseworker. Admitted on eighth day of illness, with a temperature of 105° F.; pulse 120. Delirious. Heart and lungs clear: abdomen distended; spleen enlarged; no spots. Died five days after admission, the fourteenth day of disease. **Temperature 105° F. No hemorrhage. Nephritis.**

Post-mortem: Heart normal, chicken-fat clot in right cavity. Lungs normal, save slight hypostatic congestion. Appendix normal; liver slightly yellowish in places; gall-bladder very large; walls thin. Contained three stones about the size of hickory-nuts. Spleen very large and soft, weight 190 grains. Kidneys normal in size. Parenchyma congested, **cortex diminished.**

Case IX.—G. W., male, aged fifty years; horseshoer. Admitted on twentieth day of disease. Temperature 104° F.; pulse 108. Coated tongue, offensive odor; enlarged spleen; pea-soup stools. Greatly emaciated. Heart and lungs clear. Delirium. Two days after admission profuse hemorrhage, followed by two on the next day. On the fourth day after admission patient had six hemorrhages. Death occurred on the following **day, the twenty-fifth day of disease.**

Post-mortem: Lungs normal. Aortic and mitral valves atheromatous. Liver enlarged. Spleen much enlarged and congested. Kidneys congested, otherwise normal. Intestines congested; lower bowel filled with blood. Small intestines for about eight feet from ileo-cæcal junction filled with longitudinal ulcers. Two of these were extremely large and perforated **on handling.**

Case X.—A. R., female, aged twenty-one years; houseworker. Admitted on or about the eighteenth day of disease. Temperature 104° F.; pulse 100; wildly delirious. Abdomen much distended and tympanitic. Tongue dry and brown. Heart and lungs clear. Three days after admission the patient had three quite profuse hemorrhages, followed by two more three days later. Temperature range 101°-105.2° F. Death occurred ten days after admission, about the twenty-eighth day of disease.

Post-mortem: Thorax: Organs in normal relation. Pericardial sac contained some fluid. Weight of heart 320 grammes. Left heart-muscle thick and anæmic. Right side, walls thin, currant-jelly clot. Lungs: Right, adhesions, fluid effusion, and plastic exudate over middle and lower lobe. Upper lobe firm and grayish in color. Middle and lower lobe congested, but crepitant. Abdomen: No fluid. Small intestines deeply congested, especially above the cæcum. Many large ulcers found in ileum,

some of which had nearly perforated. Spleen large, soft, and deeply congested. Weight 330 grammes. Kidneys congested.

Of the seventeen deaths in the combined Series 8 and 9, numbering 217 cases, eight must be ascribed to intense infection; five to repeated, exhausting, uncontrollable hemorrhage; two to perforation; one to peritonitis in the absence of perforation, and one to cardiac asthenia. In two other instances slight hemorrhage occurred, but it was not repeated, and had no direct influence upon the fatal result. Nephritis occurred in a large proportion of the cases, and the anatomical condition of inflammation of the kidneys was noted; but this must, I think, be regarded as an evidence of intense infection.

The Modifications.

It is no part of my present purpose to speak of the general management of the patients, the diet, stimulation, or the details of bathing. These are already very well understood.

The modifications of the method as originally formulated by Brand, which have been gradually adopted as the result of our experience, are the following:

1. The administration of purgatives at the beginning of the attack. For this purpose calomel is used, sometimes in fractional doses, more frequently in doses of from three to five decigrammes to (five seven and one-half grains). If necessary, this is followed in the course of several hours by a mild saline aperient. These purgatives are frequently repeated once or twice in cases that come in sufficiently early, but are never administered to those who come in after the tenth day of the attack.

2. External applications. Cold compresses or ice-bags are applied to the abdomen in all cases of abdominal tenderness or spontaneous pain, and in cases of hemorrhage. Where tympany is marked, turpentine stupes are applied at intervals in connection with the external use of cold.

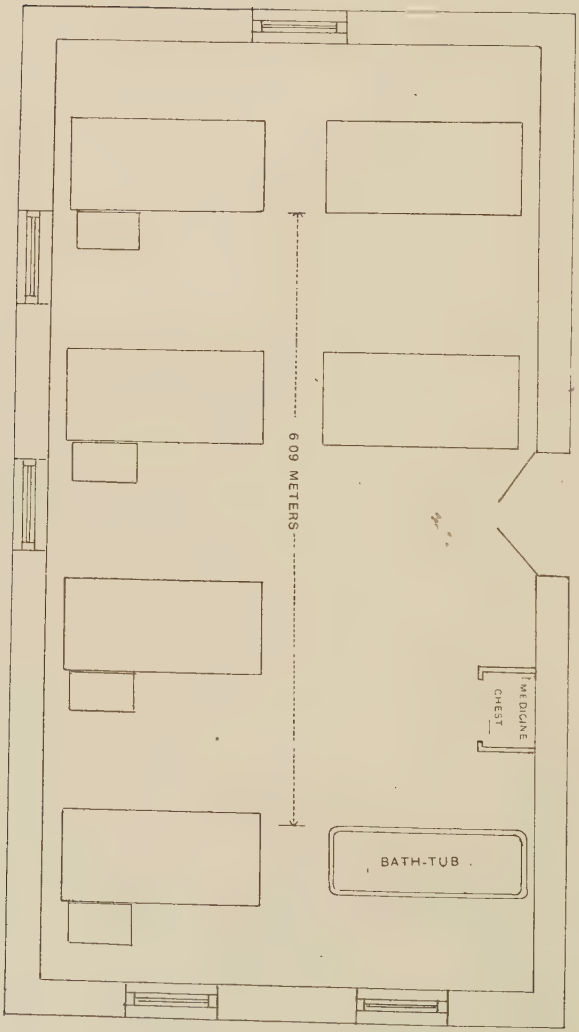
3. Medicines. The treatment by systematic cold bathing is a routine method, and is instituted in all cases. The signs of peritoneal inflammation, hemorrhage, and perforation constitute in general terms the only contraindications. Each patient, however,

is closely watched, and the morbid conditions of individual cases receive proper consideration. Appropriate medication is administered in response to special indications; hence, the quantity of alcohol varies in different cases, and such drugs as the aromatic spirits of ammonia or ammonium carbonate, strychnine, caffeine citrate, the bromides, chloral, opium and its derivatives, and hyoscine are occasionally used. Inhalations of oxygen are sometimes employed. The proportion of cases requiring any medication whatever throughout the attack is, however, very small, not exceeding 10 per cent. On the occurrence of defervescence dilute hydrochloric acid is given for a short time, and later, if anæmia persists, some form of iron, usually Basham's mixture.

4. Temperature at which the bath is administered. During the course of attack, whenever, three hours after a bath, the temperature taken in the mouth or the axilla, as the case may be, has reached 101.4° F., the bath has been repeated. Brand's original formula fixed the rectal temperature at which the bath should be repeated at 39° C., which is equivalent to 102.2° F. This arrangement was arbitrary and based upon an approximately average temperature of 39° C. in the course of the attack. In this country it is not generally customary to take rectal temperatures in the acute diseases of adults, and temperatures are usually taken in the axilla. The difference between the rectal temperature and the axillary temperature varies according to circumstances, but is nearly 1° F. It is for this reason that we have adopted the rule to repeat the bath when the axillary temperature reaches 101.4° F.

Until within the past year the baths were practically discontinued as soon as the temperature ceased to rise above this level. A very remarkable fact caused us to modify this rule, namely, every now and then a patient whose temperature no longer rose to 101.4° F. would ask to have the bath repeated, saying that it made him feel so much more comfortable. In consequence of this we have adopted the rule of giving one or two plunges a day during the defervescence, and a plunge every day or every second day for a short time after the defervescence has been completed. The result has been entirely satisfactory, and has seemed to us to hasten the convalescence.

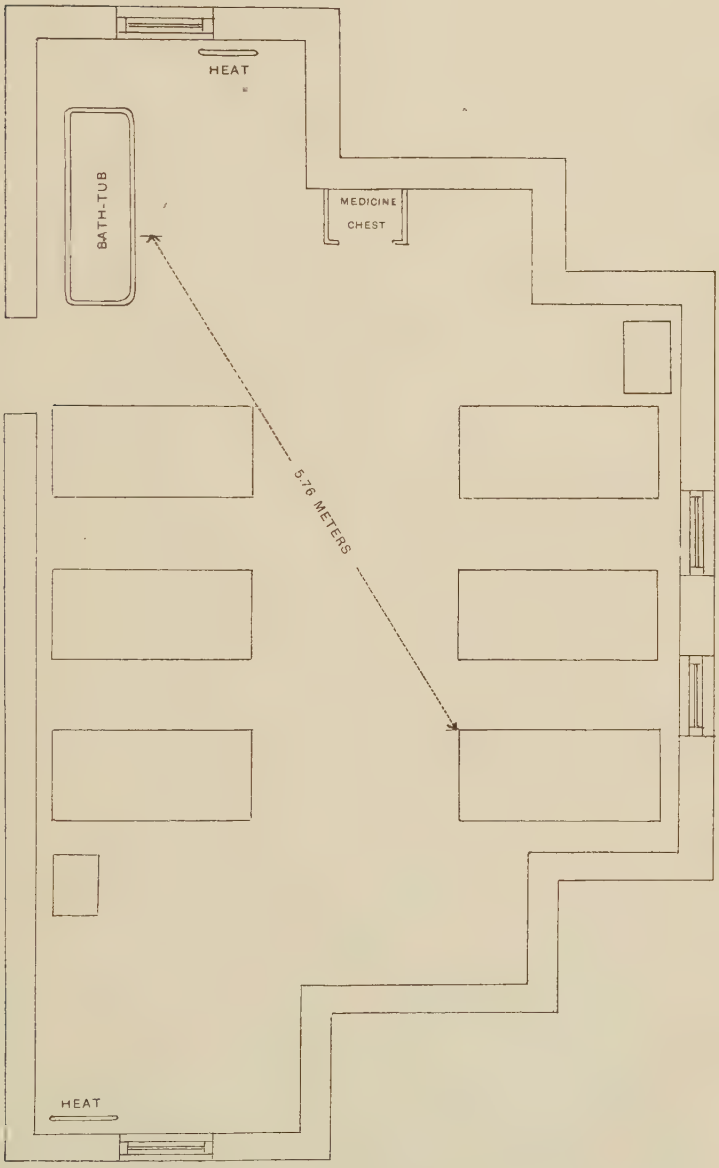
FIG. 1.



Men's enteric-fever ward.

Scale $^{5}/_{32}$ inch = 1 foot.

FIG. 2.



Women's enteric-fever ward.

5. The location of the tub with reference to the patient's bed. According to the formula of Brand, which has been universally followed, a movable bath-tub has been placed at the side of the bed, and the patient has been lifted from the bed into the bath, or has entered the bath with the assistance of the attendants. This was the invariable method at the German Hospital until about a year ago. I recall severe criticism upon the treatment, based upon the statement that the patient was allowed to sit upon the bed and to step into the bath, with the assistance of the nurses. A careful study of the previous cases led us at that time to modify this procedure. In the severer cases it was, of course, necessary to lift the patient into the bath; but, as improvement followed a series of baths, the patients were encouraged to help themselves, and under favorable circumstances it was soon found that they entered the bath with but little assistance. A different arrangement was then adopted. The bath was allowed to remain stationary at the end of the small fever wards. The graver cases were placed in the beds near the bath and were carried by the attendants from the bed to the tub and back. The milder cases and the improving cases were placed in the more distant beds, and walked to the bath, with the assistance of the nurses. The fever wards are small, each containing six beds; the most distant of which in the men's ward is a little over six metres from the bath-tub; the most distant in the women's ward being about five and three-quarters metres from the bath-tub (Figs. 1 and 2). Adjacent to these wards are other wards in which fever patients can be placed with separate tubs; but in all instances the improving cases and the milder cases are wrapped in a sheet, rise from their beds every three hours, and are assisted to the tubs by the attendants, and return in the same manner after the bath. Each individual case is carefully studied, and if any contraindication to this procedure is discovered the patient is carried by the attendants from his bed to the tub and back. In no instance have we seen any reason to believe that this modification has had unfavorable effects. On the contrary, it has appeared to be of signal service. It has exerted a very favorable influence upon the course and symptoms of the disease, particularly upon the condition of the respiratory and

circulatory functions. Quite aside from favorable empirical results there are theoretical reasons for a change from traditional methods of treating cases of acute febrile disease of long duration. Among the more striking morbid phenomena in the clinical picture of enteric fever under drug treatment, always inadequate, are the evidences of passive visceral congestions to which progressive impairment of the heart's force and the circulatory powers in general strongly contribute. Among these are especially to be named bronchitis, broncho-pneumonia, and hypostatic congestion. There are others of which one can speak less positively, since they are largely due to the action of toxins. Our experience leads us to believe, however, that somnolence, gastro-intestinal catarrh, and the intestinal paresis to which tympany is due, have been in the past favored by the log-like, continued, passive recumbency of the patient suffering from enteric fever. The muscular atrophy due to absolute disuse and the diminution of the activity of the circulation of serous fluids throughout the body cannot be disregarded in this connection. The vast majority of patients suffering from enteric fever are adolescents and young adults in the most active period of life. The disease develops with comparative rapidity, and is of long course. Have we not in enforced continuous repose been adding to the pathological process a secondary disturbance of nutrition due to disuse of function? Our experience in the last year justifies me in answering this question in the affirmative.

6. The system of Brand is designated "The Treatment by Systematic Cold Bathing." The measure of its success is determined by the period at which it is instituted in any given case; the sooner the better. Brand's claim, that the mortality is practically nothing in cases treated from the beginning, cannot in ordinary hospital practice be established. Our cases do not come to us in the beginning of the attack. But many observations have been published which show in large series of cases that the earlier the treatment is instituted the greater is the reduction in mortality. Under the ordinary conditions of hospital practice few cases are received until toward the end of the first week; the great majority later than this, and a considerable number as late as the middle of the third week. It is obvious that the treatment by

systematic cold baths instituted late in the course of the attack must largely fail as a plan. There is nothing specific in the individual bath. It is the rhythmical repetition of the stimulation of physiological processes and of the modifications of pathological processes produced by a succession of baths commenced early in the course of the attack, to which the favorable results are to be attributed.

On the other hand, there are many mild cases admitted at any time during the progress of the attack in which the temperature is so low and the defervescence occurs so soon after admission that the number of baths administered is but limited. These cases belong to the group designated under the term *typhus levissimus*, in which recovery takes place under a management purely expectant. It would be obviously unfair to claim for the bath treatment the shortened course and termination of such cases. But these two groups of cases in a certain sense offset each other, and thus justify the conclusions based upon the statistics.

I desire to thank Dr. Henry F. Page, Medical Assistant to the hospital, for the analysis of the statistics for 1896–97, and Dr. J. C. Da Costa, Jr., Hæmatologist to the hospital, for valuable assistance in the preparation of this paper.

DISCUSSION.

Dr. H. A. Slocum: I observe that Dr. Wilson has stated that the cold baths were kept up in spite of the occurrence of menstruation, and I would like much to know if they ever caused a checking or cessation of the flow, and if any evil result followed.

Dr. Arthur V. Meigs: It would be interesting if Dr. Wilson could include some information in regard to his results with the cold-bath treatment at the Pennsylvania Hospital. Probably he has not included any statement of this because his results as yet are too incomplete to enable him to make use of them. If he is able to give the College any information upon this matter, I am sure it would be of interest.

Dr. Wilson: I have purposely abstained from going into the details of the administration of the baths. The method has been repeatedly published, and is now generally understood. In regard to the effect of systematic cold bathing upon menstruation, I may state that this function is

frequently missed during the attack, but when it does occur is usually rather free. I have never seen any bad results from the administration of the bath during menstruation.

I have no statistics with reference to the occurrence of otitis in cases not bathed. This complication varies greatly in different epidemics and in different years. My general impression is that otitis is less common in cases bathed than in those not bathed.

I may say in reply to Dr. Meigs' question that I have already published a series of seventy-four cases occurring in the wards of the Pennsylvania Hospital, with a mortality slightly above 4 per cent., and that I hope hereafter to publish larger statistics from this hospital. The percentages of mortality are of little significance unless they are based upon large collections of cases. There is the greatest variation in the ten different series upon which the total figures of my paper to-night are based. Thus in the first series of forty cases no deaths occurred; in the second series of fifty-four cases one death occurred; in the seventh series of twenty-seven cases five deaths occurred. It is a curious fact that the records of large series of cases from various sources closely correspond, the percentages varying from 7.2 to 7.8 per cent.

Intercurrent croupous pneumonia is not very uncommon. Broncho-pneumonia is extremely common, and the lesions of that condition are found in a large proportion of the fatal cases. I think that broncho-pneumonia, which is very often a deglutition pneumonia, must be grouped among the manifestations of intense infection. In the later series the diagnosis in doubtful cases has been confirmed by Ehrlich's test, while in the last series almost every case was subjected to the Widal test. In these cases the investigation has been made in two laboratories, that of the German Hospital and that of the City Hall. The results have been, with very few exceptions, concurrent.

ANOMALOUS POSITIONS OF THE COLON; WITH REPORT OF A CASE DISCOVERED BY EXPLORATORY OPERATION.

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[Read April 6, 1898.]

On September 11, 1897, at Bar Harbor, Maine, E. B., aged thirty-six years, first consulted me in regard to his health. He was extremely despondent and melancholy, and stated that for weeks he had eaten very little, barely enough to keep alive, sometimes eating only once a day; that he was losing strength rapidly, and that, owing to increasing discomfort in the lower part of the abdomen on the right side, he feared that there might be some disease of the appendix.

For sixteen years he has been an invalid. He is over six feet tall, and weighs about 140 pounds. He is much emaciated, of dark, sallow complexion, and melancholy expression. He has never had any serious acute disease. No tuberculosis in his family. His father died about a year ago of sarcoma of the superior maxillary bone. His mother died of apoplexy in her sixty-sixth year. A brother and sister died of typhoid fever. One brother and two sisters are living and healthy.

At various times he has been treated for supposed disease of the liver, for chronic indigestion, for weak heart, for neurasthenia, nervous prostration, etc. He does not remember ever having had an attack of abdominal inflammation. He was always delicate as a child, but until his sixteenth year he enjoyed fairly good health. About that time he broke down with what was called nervous prostration, and he has never been well since.

For sixteen years past he has been conscious of discomfort, weight, uneasiness, and occasional sharp, sudden pain all through the region below and to the right of the umbilicus. He always eases himself in this region as much as possible. These feelings are becoming more and more intense, with at times a dull, heavy, aching pain and a feeling as if a mass as large as an orange was there. Often there is distention, and he passes much

flatus. His general symptoms are those of malnutrition and auto-intoxication from faulty assimilation of food. Often his digestion is so poor that for days he eats almost nothing. He then becomes so prostrated and weak that he can scarcely walk. Such is his present condition. At these times his pulse is weak and slow (58 or 60), and there is a dull and heavy feeling in the head as though a weight were on it. He recovers slowly from these attacks, and is able to take moderate exercise and even ride a bicycle. The discomfort and pain in the right iliac region have increased considerably during the past six months. The bowels, though seldom constipated, are usually costive, and he uses glycerin suppositories for relief. He is very despondent, and says that life is not worth living; that he would be willing to lose his right arm if thereby his general health could be improved.

Physical Examination. He is extremely emaciated, sallow, and anæmic, with an expression of deep despondency. The tongue is tremulous, large, flabby, and slightly coated. Lungs normal. Action of heart weak and slow (58). Valvular sounds normal; no organic lesion. Liver, spleen, and kidneys are apparently normal. On examination of the abdomen there is noted slight tension of the right rectus muscle and resistance over the caput coli. The colon is somewhat distended. Deep pressure at McBurney's point causes him to wince and produces decided pain. A mass in the region of the vermiform appendix can be palpated, and feels about the size of a small cigar, pointing south. Pressure upon it causes pain. The urine was examined a few days later. It was normal as to color and reaction, contained no albumin or sugar, but there were an excess of urates and a few oxalates.

The patient was told that some unusual condition existed in this region of his abdomen, with a possibility of chronic disease of the appendix, and a consultation was requested.

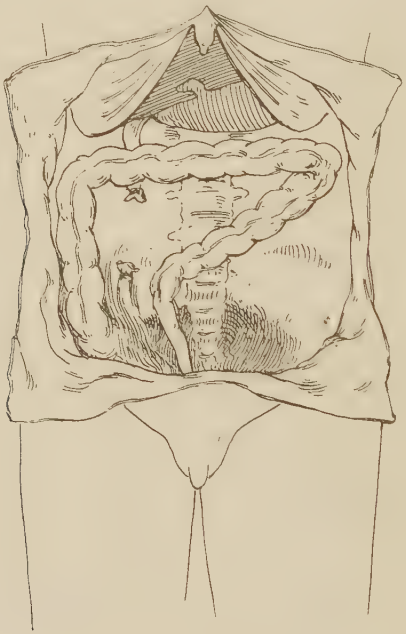
On September 13th Dr. L. Bolton Bangs, of New York, saw the patient with me. He confirmed the diagnosis of possible chronic appendicitis, and advised exploratory operation. The patient was told that the diagnosis was very uncertain; that it was clear that some abnormality existed which justified exploration. He consented, and arrangements were made to have the operation performed in Philadelphia as soon as possible after our return.

On September 27th he was admitted to a private room at the Howard Hospital, Philadelphia, and on the following day Dr. Edward Martin saw him in consultation. The same opinion was given as in the consultation with Dr. Bangs.

On September 29th I operated, with the assistance of Dr. Martin. The usual incision for appendectomy was made. The caput coli was not in its usual position. It was found dipping over the brim of the pelvis on the right side, becoming lost below the peritoneum, so that the appendix was entirely subperitoneal and could not be located. The ascending colon took its usual course. Loops of large intestine, presumably transverse colon and the first portion of the descending colon, occupied the upper

portion of the abdominal cavity and covered the small intestine. These loops could be readily drawn down into the abdominal wound. The middle portion of the descending colon was found to cross the vertebral column obliquely from above downward, and from left to right, thus causing the sigmoid flexure to enter the pelvis on the right side of the promontory of the sacrum between it and the first portion of the ascending colon; thus it occupied the normal position of the appendix, and it was the abnormally placed sigmoid which had been felt by palpation and which

Fig. 1.



caused pain on pressure. (Fig. 1.) In order to prove the anomalous position of the sigmoid at the operation, an assistant nurse was instructed to pass a long rectal tube per rectum. It was passed six or seven inches, and was found to enter the sigmoid, which was held between the fingers immediately below the abdominal wound. This would have been impossible had the sigmoid occupied its normal position. The ileo-colic juncture was sought for, but could not be located. The lower portion of the ileum, however, was traced to the anterior fold of the mesocolon, about one inch above the brim of the pelvis. It could not be traced further, as the mesocolon at this point was short and merged into the peritoneum lining the false pelvis.

Thus, in order to have found the caput coli and the appendix, it would have been necessary to have opened the peritoneum posteriorly and to have performed an extensive dissection. This course was considered unjustifiable, as there was no evidence of trouble with the caput coli or of the appendix other than their anomalous positions, and sufficient abnormality had been found to account for the state of the patient's health.

The abdominal wound was closed as quickly as possible with buried catgut sutures in layers and subcutaneous catgut for skin.

Convalescence from the operation was uninterrupted, except that on or about the tenth day superficial suppuration occurred in the wound, which required almost daily dressing for several weeks. At the end of this time there was firm, strong union. The following is a note from my case-book on November 11, 1897:

"During convalescence the patient absolutely refused to take any kind of treatment which was advised. He has been for a long time and is still in a state of nervous prostration. He is decidedly neurasthenic and a hypochondriac. Dr. John H. Musser has seen him several times in consultation, with a view to outlining some form of treatment which might meet the mechanical problems of this most unusual case. We find it impossible to do anything with him. He positively refuses to take advice."

In contradistinction to those cases in which the caput coli is found to occupy high positions in the abdominal cavity, such as the right lumbar and hypochondriac regions, and the many reported cases of imperforate anus and other cases of obliteration of one or more portions of the colon, we have to look upon this case, it seems to me, as one of overdevelopment of the colon. It is well known that in early fœtal life the colon is so arranged that it forms almost a straight canal from above downward, and that in the early months the cæcum describes a curve downward and to the right until it finds its place in the right iliac fossa at about the end of the fourth month of pregnancy. At the same time other developmental changes are taking place at the distal end of the colon which result in the formation of the rectum and anus. When this process of development is interrupted either by reason of peritonitis in the fœtus, causing adhesions, or by reason of some other cause, the normal development may be permanently arrested, or at least retarded, thus resulting in the abnormalities alluded to above. In many of the reported cases of arrested development have been found scars of the peritoneum, bands and adhesions, and even membranes separating different parts of the intestines

from each other. These seem to be indications of a peritonitis occurring in the fœtus, and they have been considered the causative agents in the arrest of development. The above case, on the other hand, is one in which the cæcum has been drawn down into a lower position in the abdominal cavity than it should normally occupy, as in a case reported by Turner (*Edinburgh Medical Journal*, 1863–64, ix., 110), carrying with it the ileo-colic juncture as well as the vermiform appendix. It is also to be remarked that it seems to have developed between the layers of the mesentery and behind the peritoneum, thus being bound down in such a manner as to have very little play. Under such circumstances it is easy to understand that there would be a constant tendency to retention of feces, and even impaction in the caput coli. By reason of its bound-down position the cæcum would have great difficulty in evacuating itself.

Again, these cases of elongated and coiled sigmoid flexures seem to me to be the result of overdevelopment of this portion of the colon. This may also be said of those cases of lengthened transverse colon, and the cases in which the descending colon ascends again before descending into the pelvis on the right side or in the middle line, or normally on the left side. The question as to whether such conditions of overdevelopment are congenital or acquired during infancy or early childhood is one which cannot be readily decided. The writer is inclined to believe that in some cases these abnormalities may reach their full development in the fœtus, but that in many instances the process of overdevelopment goes on after birth, extending over periods of years. In support of this belief it is only necessary to remember that a very large number of cases have been reported in adults; in people who have been enjoying good health until some such cause as a gravid uterus or an obstinate constipation with impaction has caused an obstruction resulting in fatal ileus. Again, many of these cases have died of some other disease, as typhoid fever or pleurisy.

Depending upon the extent and character of the abnormality, these cases must suffer more or less from a sluggish action of the bowels and have a tendency to constipation, and, therefore, must be in constant danger of obstruction.

When a condition exists such as has been described in the case above reported, it is easy to understand how difficult it would be for the colon to normally empty itself. There is a constant tendency for feces to be retained in the caput coli, and the descending colon as it crosses the vertebral column in its oblique descent from left to right would present another seat of possible obstruction. The patient declares that for many years past he has had a feeling of uneasiness, weight, and fulness in all that region below the umbilicus and to the right of the median line, and that at times he has felt as though a mass were there as large as an orange. At these times all his symptoms of ill health are intensified, and he becomes so prostrated that he is scarcely able to walk; his appetite is entirely destroyed, so that food disgusts him; he has a feeling of weight on the top of the head, the complexion becomes sallow and muddy; he sinks into a condition of great despondency, so that life does not seem worth living. These are the symptoms of auto-intoxication from retained feces, and the abnormality discovered sufficiently accounts for the condition.

Indications for Treatment which Suggest Themselves. —Regular mechanical unloading of colon by high enemas; massage; electricity, local and general; diet (experimental); blood-making food and tonics, such as carnogen and pepto-manganate of iron; aids to digestion, like pepsin, pancreatin, acids, etc.; regulated exercise and fresh air.

Eighteen Cases in which the Sigmoid Flexure and the Rectum were Found on the Right Side of the Pelvis.

Chiene (J.) (*Journal of Anatomy and Physiology*, London, 1867-69, ii., 14), among a number of interesting cases of congenital anomalies of the intestine found in the dissecting-room, records two in which the sigmoid flexure was on the right side.

1. A male. The sigmoid flexure passed across to the right iliac region, where it was tied down by the peritoneum before it entered the pelvis to the right of the middle line.

2. A male. The cæcum and ascending colon were largely dilated and their coats thinned. They possessed a large mesentery, and were freely movable. The sigmoid flexure crossed to the right side and was tied down in the right iliac fossa before it entered the pelvis on the right side of the middle line.

3. Gruber (W.) (*Arch. f. path. Anat.*, etc., Berlin, 1865, xxxii., 94) reports several abnormalities of the colon, the third being a case where the descending colon crossed the vertebral column obliquely, and the sigmoid and rectum thus descended on the right side of the pelvis. (Similar to case of E. B.)

4. He records still another where there was shifting of the rectum to the right side, the sigmoid descending into the pelvis over the promontory of the sacrum.

5. Reid (J.) (*Edinburgh Medical and Surgical Journal*, 1836, xlvi., 70–74) quotes a case recorded by Annesley, that of a boy seven years old. The caput cæcum was found lying in the right lumbar region; from this it followed its usual course until it reached the left iliac fossa, where it crossed the spine to the right iliac fossa; here it turned upon itself and passed into the pelvis upon the right side. The trunk of the interior mesenteric artery, after sending off the left colic and sigmoid branch, passed to the right of the spine, accompanying the intestine. The testicles had descended.

6. Buchanan (A.) (*London Medical Gazette*, 1839, ii., 639; 1840, ii., 99, 143), in an article entitled "Fatal Cases of Obstruction and Enormous Distention of Belly Arising from a Peculiar Conformation of the Colon," describes a case in which the colon observed its usual course as far as the left groin, when it again ascended as high as the transverse arch immediately under the liver, and then turning to the right side, it descended into the pelvis.

7. Another case was that of a man whose bowels had been obstinately constipated for some time. The patient died eight days after admission to the hospital in agony from distention. The sigmoid flexure was much larger than usual, lying chiefly in the umbilical region, in front of the small intestines, having its ascending portion on the left side and its descending portion on the right. The obstruction was due to a twist of the intestine where the colon terminates in the rectum (Fig. 2).

8. Von Droste-Hulshoff (J.), in 1829 (*Abhandl. u. Beob. d. aerztl. Gesellsch. zu Munster*, 1829, i., 118–126), related an instance of a girl, eleven years old, who died from obstruction of the intestines. The autopsy showed that the sigmoid flexure crossed into the right iliac region over the body of the last lumbar vertebra, and then, curving to the left, descended into the pelvis on the right side. The proximal portion of the loop lying over the beginning of the rectum caused obstruction by pressure.

9. Thompson (T.) (*London Medical Gazette*, 1836, i., 557) saw a male infant, fifteen months old, who died after an attack of pneumonia followed by pertussis. On opening the abdomen only small intestines could be seen. The whole of the colon was found behind the small intestines, and the sigmoid flexure crossed into the right iliac region over the promontory of the sacrum, and there descended into the pelvis on the right side.

10. Vickery (H. F.) (*Boston Medical and Surgical Journal*, January 18, 1898, 34) records the case of a patient who is living to-day and has obtained life insurance without difficulty. There is complete transposition of the viscera.

On examination the heart, liver, and spleen were found to be transposed from their normal positions to the opposite side of the body respectively. On inflation, the stomach was found lying toward the right side instead of the left side, and air injected per anum distended the colon on the right, as if the descending colon were upon that side. The left testicle, as in other men, hung lower on the left side, and he was right-handed.

Fig. 2.

11. Maddox (E. E.) (*Journal of Anatomy and Physiology*, London, 1882-83, xvii., 403) records the post-mortem of a male subject. For some inches below the splenic flexure the descending colon occupied its usual position, but thence with an abrupt curve it passed across the abdomen to the right side and lay in this horizontal part of the course, behind the small intestines and the origin of the mesentery, bound by peritoneum to the aorta and vena cava near the termination of the former. It was then continued into an ample sigmoid flexure in the right iliac fossa, which lay in front of the cæcum, and was invested by peritoneum derived from the covering of that viscus through a mesocolon about two inches wide. The rectum crossed down the right side of the sacrum, and but for this reversal of position bore its normal relation to the peritoneum.

This abnormality must from its nature have been congenital, and differs essentially from the not infrequent displacements of the sigmoid flexure to

the right, attributed to the exceptional length of the mesocolon, and in which the descending colon must of necessity lie *in front* of the small intestines, to reach the right iliac fossa. Their occurrence must be viewed as more or less accidental, and due to the extreme license afforded to the sigmoid flexure by the unusual length of its tether.

12, 13. Gruber (*Arch. f. path. Anat.*, etc., Berlin, 1885, xcix., 497) describes post-mortems of two adult males, in both of whom the sigmoid flexure entered the pelvis on the right side of the promontory of the sacrum. One case died of typhoid and the other of typhus fever.

14. Barton (J.) (*Transactions of the Royal Academy of Medicine*, Ireland, 1889, vii., 392) reports the following unusual arrangement of the large intestine discovered in the body of an old male in the dissecting-room. The ascending and transverse colon were in their normal position, but their peritoneal attachments were so long that they could be drawn into any region of the abdomen. The descending colon was normal until it reached the level of the second lumbar vertebra. Here it turned across the abdomen, attached to the under surface of the mesentery, to the right iliac fossa; the intestine ran up in the right lumbar region and touched the under surface of the right lobe of the liver; here a short band of adhesion attached it to the liver. It then turned down again to the outer side of the ascending coil into the right iliac fossa, and passed into the pelvis well to its right side, and so on to the anus.

15. Melsome (W. S.) (*Proceedings of the Anatomical Society of Great Britain and Ireland*, London, 1893, p. 30) reports four cases of unusual position of the sigmoid flexure, which are interesting in connection with the case reported. In one of them the rectum was situated in the right side of the pelvis.

16. Farenholt (A.) (*Boston Medical and Surgical Journal*, 1894, cxxxi., 427), while operating on a cadaver in the Bellevue Hospital Medical School, found the cæcum in the right hypochondriac region, in close proximity to the gall-bladder. The appendix was normal and pointed downward. Both structures were held in their place by the mesentery. The sigmoid flexure occupied the usual position of the cæcum on the right side. There were no peritoneal adhesions present.

17, 18. Mundell (D. E.) (*Dominion Medical Monthly*, Toronto, 1895, v., 39) reports two cases in which the sigmoid flexure occupied the right iliac fossa.

In illustrating the operation for appendicitis on the dead subject to the class in operative surgery the following condition was found: The usual site of the cæcum was occupied by the sigmoid flexure, which, passing transversely across the body of the fourth lumbar vertebra, formed a bend in the right iliac fossa, and then ran down into the pelvis on the right side. The cæcum was high in the lumbar region, being on a level with the upper border of the fourth lumbar vertebra.

The next case he met in the dissecting-room. The sigmoid circled the

left iliac fossa lying close behind Poupart's ligament; then ran back along the left margin of the pelvis, across the sacrum to the right side, and then down into the pelvis. No investigation was made as to the situation of the appendix.

Examples of Other Abnormalities and Malformations of the Intestines.

Abernethy (J.) (*Phil. Trans.*, London, 1793, 63–65) describes an anomalous condition of the intestines in the body of a boy brought to him for dissection. The length of the colon was uncommon: having, as usual, ascended to the right hypochondrium, it was reflected downward even into the pelvis; it then reascended to the left hypochondrium, and afterward pursued its usual course. The duodenum, jejunum, and ileum, when detached from the body and extended, measured only two feet in length, while the extent of the large intestine exceeded four feet. The utmost length of the intestinal tube was little more than six feet, whereas it should have been about twenty-seven feet.

Behm (*Woch. f. d. ges. Heilk.*, Berlin, 1838, iv., 698) reports a case of an infant in which the autopsy showed a general undeveloped state of the alimentary tract extending from the stomach, which had a capacity of only two drachms, to the descending colon, the lower portion of which was fully developed. The undeveloped portion was so narrowed as barely to admit a small sound throughout its length.

Cabot (*Boston Medical and Surgical Journal*, 1861, 546) reports the case of a boy thirteen years old, who died of perforative appendicitis. The arch of the colon was parallel with the ascending portion, being pushed aside by a soft, resonant, elastic tumor which occupied the left side and centre of the abdomen. This proved to be the wall of a sac formed by a separation of the layers of the mesentery which usually constitute the transverse mesocolon. This contained the greater part of the small intestine, and was evidently congenital, as the mouth of it was two or three inches in diameter, and the margin smooth and rounded. The intestine itself was unchanged. The other organs were normal.

Chiene (J.) (*Journal of Anatomy and Physiology*, London, 1867–68, ii., 14–18) relates a case found in the dissecting-room, in which the duodenum passed upward into the right hypochondrium, and then sweeping downward into the right lumbar region, became continuous with the jejunum without crossing from right to left in front of the aorta. Nineteen feet of coils of small intestine occupied the right and middle regions of the abdomen. The cæcum was not lodged in the right iliac fossa, but lay loose in the cavity of the abdomen. A mesocæcum, five inches broad, directly continuous with the mesentery, passed to the surface of the last lumbar vertebra. The colon, twisted on itself and not subdivided into an ascending and transverse portion, lay to the left of the middle line, and was continuous with

the descending colon and sigmoid flexure, which occupied their proper regions.

Also in the case of a female, the cæcum was situated in the right hypochondriac and lumbar regions; the right iliac fossa was covered by the parietal peritoneum, and the ileum passed through it to join the cæcum.

Fairland (E.) (*British Medical Journal*, 1879, i., 851) reports the following interesting condition found at autopsy following an unsuccessful left lumbar colotomy: A bifurcation of the intestine commencing one and one-half inches from the pylorus. One portion, which was probably the small intestine, ended in a blind pouch. The other portion was of smaller diameter, also ending in a blind sac from which sprang a rudimentary vermiform appendix and a pipe-like portion of gut terminating at the cul-de-sac forming the rectum.

Gruber (W.) (*Arch. f. path. Anat.*, etc., Berlin, 1865, xxxii., 94) describes five cases of anomalous position of the intestines, in one of which the descending colon crossed the vertebral column obliquely, then turning again in its axis, recrossed in the opposite direction, and the sigmoid and rectum entered the pelvis in the normal position.

In another place he reports (*Oesterr. Zeitschr. prakt. Heilk.*, Wien, 1865, xi., 269) a case of fixation of the descending colon by means of a broad mesocolon in front of the lumbar vertebræ, the upper part of the sigmoid being in front of the sacrum.

Hurd (*Boston Medical and Surgical Journal*, 1885, cxiii., 294). Imperforate anus. The sigmoid flexure opened into the prostatic portion of the urethra. The child lived fifteen months, feces passing through the urethra. Such cases seem to be a reversion to a primitive type of vertebrate life.

Reid (J.) (*Edinburgh Medical and Surgical Journal*, 1836, xlvi., 70–74) has contributed a very valuable paper on the subject, and reports a case of an individual who died of some thoracic disease. Autopsy showed the caput cæcum was placed in the upper part of the left lumbar region; the colon first passed through the left lumbar region to the lower part of the left iliac fossa, it then turned up again to the left lumbar region, the ascending portion lying internal to and nearly in close apposition with the descending portion; in the left lumbar region it again formed an acute angle and again traversed the left lumbar region and left iliac fossa, close to and internal to the ascending portion, and then passing over the sacro-iliac synchondrosis it terminated as usual in the rectum.

He also mentions another case in which coils of large intestine with sharp flexures occupied the left lumbar region. At one of these angles there was an obstruction from which the patient died. The malposition in both cases was the original formation of the parts and not the effect of disease or any other agency.

In the same paper Dr. Reid comments as follows:

"Beside the cases of transposition of the whole of the viscera, various

irregularities in the position of the large intestines are mentioned by practical authors and by those engaged in elucidating the development of the fœtus; some of these undoubtedly arising from original conformation, and others from disease. The most common of the former of these seems to depend upon the unusual length of the intestine, particularly of the transverse arch of the colon." He quotes Morgagni and Annesley as giving examples, also Dr. Wells (*Transactions of the Society for Improving Medical and Surgical Knowledge*, vol. iii.), and G. St. Hilaire. Reid goes on to say that the caput cæcum may be placed higher than usual so as to lie in the right lumbar region or toward the umbilicus. Annesley gives one case in which the caput was found in the middle of the pelvis. The body was that of a female, who had died of pleurisy, in whom the caput cæcum was placed loose in the lower part of the pelvis, and the ascending colon was firmly fixed by the peritoneum in the right iliac fossa. The sigmoid flexure, after passing into the pelvis, turned upon itself at an acute angle, and re-entered the left iliac region, about the middle part of which it formed an acute angle and returned to the pelvis. All the abdominal viscera were quite healthy.

He goes on to say that in connection with the high position of the cæcum we may have the colon passing from the umbilical region down the centre of the abdomen, to terminate in the rectum. These are the more interesting, as they approach nearly to the position which the large intestine occupies in the first months of fœtal development.

Meckel (*Manuel d'Anatomie Générale, Descriptive*, etc., Tome ii.) has ascertained that in the early months of utero-gestation, the colon does not consist of ascending, transverse, and descending portions, as in the adult; but is nearly straight, and that it is only toward the end of the fourth month that the caput cæcum reaches the right lumbar region.

According to Serres, the position of the caput cæcum in the right iliac fossa is intimately connected with the descent of the testicle in the male and that of the ovary in the female. In those cases where the descent of the testicle has been arrested he has found that of the cæcum also arrested. According to Meckel, the descending colon describes a larger curvature in the left iliac fossa in the fœtus during the latter months of utero-gestation, so that its appearance in the adult is only the continuance of the arrangement peculiar to the fœtus at that period. Though many of the abnormal appearances in the adult can be beautifully and most satisfactorily accounted for by the arrestment of the development, yet there are others which as yet cannot be thus explained.

Turner (W.) (*Edinburgh Medical Journal*, 1863–64, ix., 110–16) reports two cases of malposition of the cæcum:

1. Adult male. The cæcum occupied the right lumbar and hypochondriac regions. It was loosely attached by an extensive mesentery, which allowed it to be thrown across to the left of the median line. It passed immediately into the transverse colon; there being no ascending colon, its place was occupied by the terminal end of the ileum.

2. Aged female. The cæcum was misplaced downward, resting on the floor of the pelvis. Owing to this position the lower end of the ileum also entered the pelvis and passed to the right side of that cavity to join the large intestine. The cæcum and as much of the ascending colon (about two inches) as was placed in the pelvis were completely surrounded by peritoneum, so that they possessed considerable mobility and could be thrown over to the left of the pelvis, or even drawn upward within the cavity of the abdomen proper. In this case the development, instead of being arrested, was excessive, the cæcum and ascending colon passing through their proper regions to one beyond.

This case is of particular interest in connection with the case which I have reported to-night, in which it will be remembered that there was an overdevelopment of the cæcum, as shown by its occupying the true pelvis.

Alexander (J. M.) (*Cincinnati Lancet and Clinic*, 1880, N. S. iv., 511). Case of double colon in a boy, aged eight years. This case proves to be not a true double colon, as the title implies, but a reduplication of the colon upon itself by a sharp flexion at the position of the sigmoid, ascending to the right of the descending colon eleven inches, and descending again to the right and joining the rectum. The whole colon measured six feet.

Buchanan (A.) (*London Medical Gazette*, 1839, ii., 639) remarks that the colon is more subject than any other part of the intestinal canal to vary in length and in mode of disposition. Upward of twenty examples of such variations will be found recorded in the works of Morgagni. The most common of these variations is that observed in the transverse arch of the colon, which, instead of running straight from right to left immediately under the liver and stomach, is inverted downward, so as to reach the umbilicus or even the urinary bladder. He goes on to cite various cases from Morgagni, among which was one in which the colon, after observing its usual course as far as the stomach, passed thence right down to the sacrum in front of the small bowels. Instances are not infrequent of the sigmoid portion of the colon deviating from its usual course. It sometimes passes from the left groin across the fundus of the bladder to the right groin, and thence ascending and turning to the left, it goes over the top of the sacrum to form the rectum. A case is quoted from Morgagni in which the sigmoid flexure of the colon lay almost completely in the umbilical region of the abdomen.

In another remarkable case, the colon, crossing from the left to the right groin, ascended parallel to the right colon, and then, turning to the left, descended near the mesial line of the body into the pelvis. Of the deviations from the usual conformation of the colon described above, those occurring at the proximal or middle portions of the intestine do not appear to be productive of any disease or inconvenience to the individuals so constituted.

On the other hand, the deviations which occur at the distal extremity of the colon have been, in several instances, found to accompany a very severe

disease which doubtless is produced by the faulty conformation. He relates a case, aged forty or fifty years, which died of obstruction with enormous distention. All kinds of purgatives had been used in vain. At autopsy the colon was found to observe its usual course until it reached the left iliac region, when it made a sweep to the right, passing behind the pubes and returning across the lowermost lumbar vertebra; it then ascended until it came in contact with the transverse arch, when, turning to the right, it descended to the sacrum. The obstruction had taken place at the promontory of the sacrum, where the beginning sigmoid was pressed between the overlying fold of colon and the promontory.

Fig. 3.

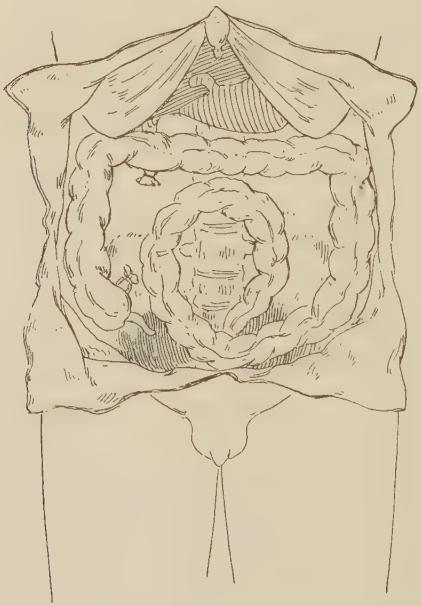
The second case was a female of forty years, of costive habit. Nine days previous to her admission to the hospital, nothing had passed from the bowel, and the obstruction continued until her death, five days later. Autopsy showed an enormously distended colon. It followed its usual course to the left iliac fossa, and then ascended as high as the transverse arch and, turning to the right, descended nearly in the middle line of the belly to form the rectum. There was also an incurvation downward of the right half of the transverse arch. At the termination of the colon in the

rectum the intestine was observed to be twisted from left to right, and this was the cause of the obstruction.

The third case was one of right-sided sigmoid flexion, already quoted.

In a subsequent paper (*London Medical Gazette*, April 17, 1840, p. 143) he reviews the subject of obstruction of the bowels the result of congenital or anomalous displacement of the colon, and adds two more cases from the literature of the subject. The first occurs in the *Sepulchretum Anatomicum* of Bonetus, the father of pathological anatomy, and, we may therefore add, of rational medicine. It is extracted from the observations of Tidicæus, who flourished in the end of the sixteenth century. (Fig. 3.) A pregnant woman, who was a seamstress and worked daily from early dawn until late at night, became so constipated that just before her confinement she had not had a passage from the bowels for twenty days. Nothing relieved

Fig. 4.

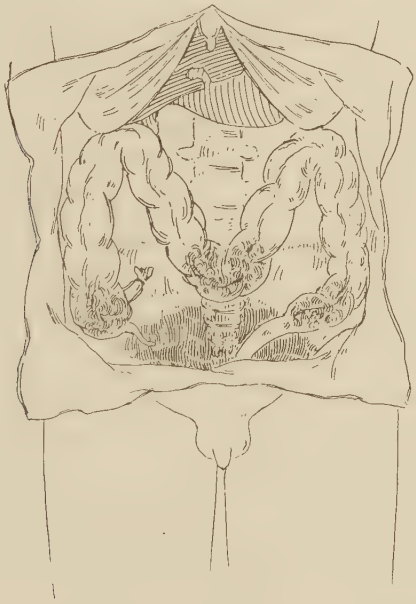


the incredible pain and swelling of her belly. Labor at length came on, and she was delivered of an immature, but living, child. Notwithstanding the expulsion of the fœtus, the belly did not in the least diminish in size. The bystanders thought that the belly would burst on account of the excessive tension. She died soon after her labor, and the autopsy showed the colon

enormously distended with excrement and wind. The colon at that part where it descends from the left kidney turned to the right as far as the region of the umbilicus, under which, and situated between the tracts of the recti muscles, it was seen descending in the middle of the belly, in a straight line from the stomach. A twist in the lower part of the colon had taken place where it is continuous with the rectum, thus causing the obstruction. Buchanan thinks that the obstruction was not due to the twist, but to the unusual position of the colon, lying between the promontory of the sacrum and the gravid uterus.

The other case was observed by Abercrombie, of Edinburgh, in 1815 (*Edinburgh Medical and Surgical Journal*, xvi., p. 15). A man, aged sixty

FIG. 5.



years, died of obstruction of the bowels. He had suffered twice with similar attacks. The sigmoid flexure crossed to the right and in front of the bladder, then ascended toward the umbilical region, then turning sharply to the left descended beneath the first section of the sigmoid into the pelvis. The obstruction occurred at this point. (Fig. 4.)

Dressel (C. F.) (*Journ. d. Chir. und Augenh.*, Berlin, 1833, xix., 664–668) reports the case of a girl, nineteen years old, who died after great suffering from obstruction. The colon was enormously distended. The first portion

of the transverse colon descended as far as the uterus, and then the second portion ascended again to the left hypochondrium, where it joined the first portion of the descending colon. The caput coli, the dependent loop of the transverse colon, and the sigmoid flexure were filled with masses of hard excrementitious matter, thus producing the obstruction. (Fig. 5.)

Esquirol (*Journ. Gén. de Méd. Chir. et Pharm.*, Paris, 1818, lxii., 341) reports a case in which the transverse colon, after making a sharp curve in the right hypochondrium, descended perpendicularly in the middle line and entered the pelvis directly behind the pubes. The patient was an insane woman, aged twenty-eight years, who died from obstruction of the bowels.

Fiske (D. S.) (*Northern Lancet*, Plattsburg, N. Y., 1853, vii., 85). A case of an infant who died with imperforate anus. The child had been operated upon when twenty-four hours old, and died in a few hours. The colon, after running through its usual course to the left iliac fossa, formed the sigmoid flexure. From this point it passed into the pelvic cavity, and ascending again terminated in the pelvis of the right kidney, thus occupying the place of the ureter. The calibre of the intestine was not in the least diminished to the very point of attachment in the kidney.

Malden (J.) (*Midland Medical and Surgical Reporter*, Worcester, 1828–29, i., 53). An adult female dead of ileus. The transverse colon descended from the right hypochondriac region to the right iliac, and then ascended again to the left hypochondriac region, whence it pursued its usual course.

Smith (H.) (*London Medical Gazette*, 1840, i., 789). An infant died with imperforate anus. The colon was much inflated. It passed up on the right, and, making a short turn across the umbilical region, terminated in a smooth rounded extremity or blind sac. There was a well-formed caput coli, but no appendix vermiformis. The small intestines were healthy and perfect.

The sigmoid flexure and rectum seemed not to have been formed, but upon examining the pelvis there appeared a tortuous gut not larger than a swan's quill, which could be traced along the left side of the spinal column, and which, passing through the pelvis, terminated in the anus.

Walters (W.) (*Medical Examiner*, Philadelphia, 1855, xi., 724). The first born of twins died ninety-eight hours after birth. The surviving twin-sister was healthy, without any defect or malformation. At autopsy the left metacarpal bone and phalanges of the thumb were entirely absent, and the hand was bent upward upon the wrist at a right angle.

Six inches below the cæcum the colon terminated in a cul-de-sac. The terminating point of the colon was a little below the commencement of its transverse portion, and adjacent to this point it was found again commencing in a cul-de-sac, and extending thence uninterruptedly several inches to the sigmoid flexure. The whole extent of this portion was contracted almost to a cord, and was entirely empty. The rectum was also empty and contracted in its upper portion.

Dayabhai (N.) (*Indian Medical Rec.*, Calcutta, 1893, iv., 286) relates a

case found at autopsy, in which the descending colon crossed obliquely downward from the splenic flexure to the caput coli in the right iliac fossa. From this point it turned straight across over the promontory of the sacrum to the left iliac region. Here it formed the sigmoid, which entered the pelvis normally.

The normal course of development of the intestines has been described by Professor Flower (*Medical Times and Gazette*, 1872, i., 291), and also by Professor Cleland (*Journal of Anatomy and Physiology*, May, 1868; May, 1879; April, 1883). He says that a peritonitis occurring in fœtal life by the formation of temporary or permanent adhesions could so modify development as to give rise to almost any deformity, arrest of development, or anomalous position. Old scars of the peritoneum are frequently found in these anomalous cases, and occasionally the bands and adhesions persist as in a case reported by R. B. Young (*Journal of Anatomy and Physiology*, London, 1884–85, xix., 98).

Robinson (B.) (*Gaillard's Medical Journal*, New York, 1895, lxi., 307), in an article entitled "Unusual Cæca in One Hundred and Thirty Autopsies," says: "The most impressive, unusual cæca are the excessively developed ones which lie on the pelvic floor, or are turned toward the middle of the abdomen."

REASONS WHY THE PLACARDING OF HOUSES IN WHICH ARE PERSONS SUFFERING WITH SCARLET FEVER OR OTHER CONTAGIOUS DISEASES SHOULD NOT BE CONTINUED.

By ARTHUR V. MEIGS, M.D.

[Read February 2, 1898.]

It may be that some of those who are present have not fully informed themselves in regard to the law which governs the present practice of the Philadelphia Board of Health. It is an act of June 18, 1895, and Section 2 reads as follows:

Section 2. Upon receipt by the health authorities of a report of the existence of a case of cholera, smallpox (variola or varioloid), scarlet fever, typhus fever, yellow fever, relapsing fever, diphtheria, diphtheritic croup, membranous croup, or leprosy in any of said municipalities, they may at once place or cause to be placed, in a conspicuous place or places upon or near the house or premises in which said case may be located, a placard or placards upon which shall be printed in large letters the name of the disease from which the person or persons in said house or premises may be suffering as aforesaid, as the case may be. Provided that variola or varioloid shall be placarded as "smallpox," and that diphtheritic croup and membranous croup shall be placarded as "diphtheria," and said placard or placards shall remain thereon until such time as the rules and regulations established by the health authorities regarding the destruction or disinfection of infected bedding, clothing, or other articles which have been exposed to infection and the disinfection of houses and premises have been fully complied with. Provided that in addition to the placarding aforesaid, or in lieu of the same, the said health authorities may place a guard or guards upon said house or premises.

The point to which I wish to direct attention is that the law distinctly provides that placards *may* be placed upon houses, but

that their use is not obligatory. It is desirable that every physician in the city should know that this whole question is absolutely in the hands of our local authorities. The board has the power, if it should see fit, by the simple passage of a resolution, to change to-morrow its procedure and cease the use of placards.

The temptation to enter upon a detailed arraignment of the Board of Health of our city, both of its constitution and its administrative methods, is strong, but it would not be wise to do this now. It is enough at present to call attention to a few defects. Although the board is composed of six members (including the Director of Public Safety, who is *ex-officio* its president), two only are physicians. Whatever may be said of the physicians, it is certain that the other members have never been chosen because of their knowledge of sanitary science. Such being the composition of the board, let us pause a moment to consider in what manner it has administered its important functions. It must be conceded in the first instance that its duties are of such a nature that it often incurs unpopularity because its actions cause hardship to individuals. Are there heard in our city no expressions of disapproval of the board except these unavoidable ones which have been indicated? Far from it; as well as I can learn, all classes of people who come in contact with the Board—citizens who suffer from sickness, physicians, plumbers, and undertakers—all alike condemn both the rulings of the board and its administrative methods.

I will give only two instances as types of unwise actions of the board—one to show the wrong it is capable of doing physicians, and the other as an illustration of the iniquitous behavior of one of its inspectors. In the early part of last summer the Board by resolution directed the Health Officer to prosecute a physician for not having reported a case of scarlet fever. When the case was called in court it was shown that at the time of the first visit the diagnosis was not made. A second visit was not desired by the people, and the patient was not seen again until ten days or more afterward, when, on being summoned to the house and finding the patient to be suffering with dropsy and the skin desquamating, the physician judged the disease to be scarlet fever, and at once reported it as such. The magistrate decided that as the case had been

reported as soon as the nature of the disease was recognized, no offence against the law had been committed, and accordingly the physician was ordered to be discharged. What are we to think of a board which is so ignorant of the law or so careless of the rights of physicians as to subject one of them to the expense, humiliation, and injury of prosecution upon such flimsy grounds?

The second case is as follows: Within a few weeks a physician was called to the house of a man belonging to the working class, where he found a child with scarlet fever. The mother did not wish her child taken to a hospital, and, therefore, after investigation to satisfy himself that the house was in good sanitary condition, the physician reported the case and certified that the patient could "be properly cared for at home," and that the premises "did not need sanitary inspection." Notwithstanding this, the Medical Inspector of the Board of Health came to the house and rudely told the mother that she would not be allowed to keep her child at home, and that the ambulance would come the next day to take the patient to the hospital. The ambulance was never sent, but a few days later the inspector returned, and was much more polite, not so much as alluding to any necessity for the removal of the child to the hospital. What can be thought of an official inspector, whose duties necessitate constant intercourse with people in trouble owing to sickness, who could be so wantonly cruel and brutal as to indulge in an idle threat against a poor mother nursing her sick child, when the event proved that there was neither intention nor power to execute the threat?

The Board of Health is responsible for all misbehavior on the part of its officials, and if it continues in its present course of folly there is danger that at last our long-suffering people will rise up in rebellion against the injuries that are done them; and then sanitary science and the march of improvement will receive a check from which they can recover only very slowly, because measures that entail great hardship upon individuals can be put in execution only if supported by public opinion.

Last summer I took occasion in London and Paris to make inquiries in regard to what is done in the management of contagious diseases occurring in those cities. In London I was referred

from the embassy of the United States to the Local Government Board for information, and in Paris the secretary of the consul-general advised me to inquire of the Administration Générale de l'Assistance Publique. I was told that no such thing as placarding is done in either city. What struck me more than anything else in my interviews was that in both cities the officials seemed greatly impressed with the necessity of avoiding running counter to the sentiment of the medical profession. In London the official smiled when I told him of yellow placards, and said, "Our people would not submit to that." In Paris it was evident that the sentiment against any intrusion upon family privacy is so strong that the government dreads rousing opposition upon this point. The feeling in France in regard to the sacredness of family privacy is well known by every one who has bestowed any consideration upon French customs.

There may be some here who will say that it is nothing to us in the United States what they do in Europe. Such a sentiment is very narrow-minded. Conceit in regard to the perfection of our own methods is as unbecoming as would be a slavish imitation of European customs. Our only wise course is to acquire information wherever we can get it, and to adopt improvements regardless of their source. It is, therefore, very important that we should be fully informed in regard to what is doing in Europe. Sufficient attention is not paid at present in this country to the opinions of physicians in regard to questions of health. It seems as if the guidance of sanitary legislation and its management have passed into the hands of politicians, and that little or no reliance is placed upon the statements of the physicians who actually attend the sick. This is a most foolish thing, for in the end it is upon the physicians that municipal and rural officers of the law must depend for much of their information in regard to disease, and if the ill-will and opposition of the former are incurred little can be accomplished. In England the law provides that every time a physician makes a report of a case of contagious disease he is paid two shillings and sixpence if the case is in his private practice, or one shilling when the report is made as officer of an institution. If our city would send a commission of two or three properly quali-

fied persons to study and report upon the methods of sanitary procedure in Boston, New York, Washington, and Chicago, and then in London, Glasgow, Paris, and Berlin, a great deal of useful knowledge would be acquired which is very much needed. At present our health authorities are not going about the matter in the right way. The diseases which may be placarded, according to the law of 1895, are of the kind against which most can be accomplished by efforts looking to their prevention, for which little or nothing is being done. Our health authorities should direct their efforts to cleanliness and measures to improve the general hygiene of the city, instead of advertising, by the posting of yellow placards, the existence of disease after it has come. The right method is for the physicians to notify and the health officers to prevent.

There are several reasons why houses should not be placarded and various ways in which placarding is productive of harm. The state of panic created in the public mind is certainly an evil, for it is perfectly well known how difficult it is to deal with frightened people. Probably the greatest harm which comes from the enforcement of placarding is that it greatly increases the number of cases that are concealed. The public and physicians join hands in this practice, and it is only what might be expected. Respectable physicians have told me that they never report cases of diphtheria if they can avoid it, or report them only when they think death is imminent and the risk of detection becomes very great. In a pamphlet entitled *Rules for the Management of Contagious and Infectious Diseases by the Sanitary Committee, Adopted by the Board of Health*, May, 1893, there is included an extract from the *Supplement to the Reference Handbook of the Medical Sciences*, by William H. Ford, M.D., President of the Philadelphia Board of Health. Among other things in this extract, which is incorporated as an integral portion of the "Rules," is the following: "There is a difference of opinion as to the advisability of placarding houses in which contagious or infectious diseases exist. There are benefits to be derived from warning the public of danger; but on the other hand, the common aversion to the requirement may lead to the suppression of the true knowledge of the disease, which may be attended with disastrous consequences. Under a

well-organized system of sanitary inspection this practice might be dispensed with." As the late President of the Board of Health expressed himself in this manner, and his opinion received the official indorsement of the board only two years before the same board adopted the practice of placarding houses, why is it not its duty to institute the "well-organized system of sanitary inspection," which the board itself declared would enable it to dispense with the oppressive practice of placarding?

The placarding of houses for contagious diseases involves trampling under foot the rights of individuals and such violent intrusion upon family privacy that we ought to pause and ask if we are not in danger of losing one of our precious heritages derived from our English origin, that "every man's house is his castle." How much immunity from disease have we obtained in return? The mortality records would seem to indicate that we are less free from typhoid fever and diphtheria in Philadelphia than they are in London, where yellow placards are never used, but where there is a good sanitary system.

DISCUSSION.

Dr. James Tyson: Dr. Meigs has covered the whole subject so thoroughly that there seems to be little left for me to add, except by way of emphasis. I may, however, premise that I am glad, indeed, to have the opportunity to raise my voice against what seems to me a cruel and useless regulation. That it is cruel, and that it works hardship to many who can least bear it, seems scarcely to require further proof. Illustrations are easily adduced, and among such illustrations our own ranks furnish some of the most forcible. Thus I am appalled when I think what would have been the consequence to me between twenty-five and thirty years ago at a time when two of my children had scarlet fever, one succeeding the other, and my house would have been placarded under present regulations eight or ten weeks. During such time, it is needless to say, practice would have been impossible. Office-patients and messengers would alike have been intimidated, and my business scattered to the four winds at a time of life when I needed it most. Even more serious are the consequences in numerous other occupations conducted in the house in which the patient lives, while the prosperous business man goes to his distant place of business unrestricted.

These well-known facts might, however, be disallowed if the practice of placarding was an efficient one or its objects could not be accomplished in other ways. It is well known, and Dr. Meigs has so stated, that the regulation is not obeyed, and is a constant incentive to law-breaking, because it is ignored in a large number of instances out of respect to the wishes of the family. I am told that the latter often offer to pay the fine in case the physician is held to account, a dilemma which the physician himself often escapes by reporting the case at the last moment before death. Or, what is worse, the officer intrusted with the duty of placarding is willing to place the odious label in some out-of-the-way place where it will not easily attract attention.

It is commonly conceded that a law which cannot be administered is worse than useless, and had better be repealed. In my judgment, the objects of the law can be accomplished in scarlet fever or diphtheria, at least, by isolation. Isolation in an upper apartment well screened-off by a sheet saturated with carbolic acid or bichloride solution, together with intelligently regulated disinfection, I believe to be sufficient to secure immunity to all who may enter the house and keep out of the room.

In the present imperfect method of carrying out the law the Board of Health and the science of medicine alike lose the benefit of reports to which both are entitled for the sake of study and prevention of disease. I am exceedingly doubtful if three-fourths of the cases of infectious disease occurring are reported; certainly a large number are not.

Dr. H. R. Wharton: Since the method of placarding has been carried out I have had a good many opportunities to observe the working of the law, and I think that a great many cases are hidden away. I happen to be called to a certain number of cases of diphtheria, for tracheotomy or intubation, which, although having suffered for a number of days, have not been reported. Some physicians say they will, and some that they will not report them, and I have no doubt that many cases are not reported at all. Another disadvantage in the present system is that physicians are very apt not to send specimens from throats for bacteriological examination by the Board of Health, as they know that as soon as a specimen reaches the Board the case is practically in the hands of the Board. Yesterday a physician told me that he had a suspicious case, and wished to know where he could send the specimen for examination. The placarding of a house does not prevent the neighbors from coming in, for I have known of cases where placards were on the doors and a dozen neighbors were in the house, so that neighbors are not deterred from making visits by the presence of placards. These points seem to me to prove that the present system of placarding does not accomplish the obect for which it was devised. I think the presence of the placard and the fact that it works great hardship in many cases on the business of the people tends to make people do all they can to prevent the placards from being put up. In many cases they offer

to pay the physician's fine rather than have the case reported, and I have had physicians tell me that such offers have been made to them. The present system certainly does stir up great antagonism in the family of the patient and in the profession as well. I think the New York method seems to accomplish all purposes and to work successfully.

Dr. Morris J. Lewis: I wish to place myself on record as opposed to the present method of placarding houses in which there are patients with certain of the contagious diseases. I am not opposed to the method in theory, for I believe that in an ideal community it would be productive of much good, but unfortunately in this age theory and practice do not always agree.

In any community it is essential that the health authorities should be kept informed concerning the number of cases of contagious disease existing, and in order to gather these facts it is essential that the health authorities and the medical profession should work in harmony and unison. I believe that the present system does not conduce to this needed harmony.

Judging from my experience, many physicians and most of the laity have a strong feeling of antagonism to the yellow placard, and whether this feeling is justified or not does not affect in the least my argument. I regret extremely that, as a direct result of this feeling of antagonism, many cases of diphtheria and of scarlet fever are never reported to the authorities, unless it seems likely that the patient may die, and even if this event does occur I feel sure that at times only part of the truth is reported on the death certificate. The direct result of this unfortunate state of affairs is that the Board of Health is kept in ignorance of many foci of contagion, and because no report has been made of the case the health authorities cannot be called upon to disinfect; as a consequence, there is either no disinfection practised or else some partial substitute, such as the practically useless method of burning sulphur, either by the physician or the patient.

It therefore seems to me that the present well-meaning system of placarding houses fails of accomplishing the object sought for, viz., the limitation and stamping out of contagious disease.

The yellow labels are frequently placed only upon the front door, and serve to needlessly alarm the community, and really accomplish but little good, as numberless calls are made to the premises by the unplacarded back gate, with absolutely no restriction to intercourse.

The statistics of typhoid fever in this city are probably very correct, because there is no object to be gained by secrecy, and those of diphtheria and scarlet fever would in all probability be so also were it not for the placard. How much better it would be for the health of the community if there was free reporting of these cases and a speedy visit of a well-informed officer, not to paste a yellow label upon the door, and then turn his back upon the case until the report came that the patient was either well or dead, but to visit the house from time to time with advice as to sanitation, etc.,

and with offers to aid freely, particularly among the humbler classes, with efficient disinfection, as well as to continue the present laudable practice of leaving behind a terse, clearly-expressed, printed page of advice.

Dr. Damaso T. Lainé: My experience agrees with the other speakers. Dr. Abbott told me to-day that but 50 per cent. of the cases of diphtheria in this city were reported by physicians. Last Saturday I was informed that one of my sister's children had a slight sore-throat, and upon examination I pronounced it tonsillitis. As I live opposite the station-house, I obtained one of their diphtheria tubes and sent the culture to the Board of Health on Saturday at noon. That same evening the child was playing around the house, and on the following day was well, without visible deposit on its throat.

On Monday I received word that the cultures were those of diphtheria. As last year I had had an experience precisely like this, where in two cases of tonsillitis the Board of Health reported them as diphtheria, I paid little attention to the notice. Yesterday afternoon an inspector came to my office with a yellow placard, and I told him there was no diphtheria in the house, but he said he had to place it on the door. I asked him to come in and examine the child's throat, and he did so, and suggested that I should go to the office and report the matter. I accordingly went to the office and asked for Dr. Pease, who had examined the slide and made the diagnosis. He showed me a slide, which contained the diphtheria bacilli. The chief clerk of the Board of Health department, who seemed to run the place, told me that the placard must go up. I begged him to be more considerate, and asked him to send one of the inspectors to examine the child, assuring him that there was no diphtheria in the house. Yesterday I made another culture, and this time the diphtheria bacilli were not found.

I am a firm believer in the bacteriological examination of the throats of suspected cases, and have used the method for four and a half years at least, but I believe there are many cases of pseudo-diphtheria in which a bacillus is found which cannot be positively diagnosed from the true Klebs-Loeffler bacillus. In such cases the opinion of the attending physician and the clinical symptoms should be taken into consideration with the bacteriological examination.

Their report made me much more cautious, and I have examined the children's throats twice daily since, but there has been no fever or visible deposit. I consider it an outrage that the Board of Health should, by placing such a placard on the door, announce to my friends and patients that there was diphtheria in my house. I do not think that diphtheria can always be positively diagnosed by the clinical symptoms alone, but the Board of Health should co-operate with the physicians in such cases. I do not see why I should not have the right to sue for damages, since Dr. Abbott himself could not stand up in court and say positively that the child has had diphtheria from the examination of one culture, while I certainly

could take the stand and swear that, clinically, the child showed no symptoms of the disease.

Dr. Milton B. Hartzell: Unless the placard is of use in diminishing the spread of contagious disease it is only an annoyance, and I am not aware that there is any evidence proving that contagious diseases are less prevalent than before placarding was employed. As has already been stated, it offers an inducement to conceal the existence of contagious diseases; and I am sure that not more than half the cases are reported, since it can be avoided in many ways. I have known of instances in which an erroneous diagnosis was made purposely. If placarding does not prevent the spread of disease, then it is useless and should be given up.

Dr. James M. Baldy: As illustrating the injustice of placarding I will instance a case of tubercular laryngitis that came under my notice. The case had been in charge of a friend for from six months to a year, suffering from a chronic tubercular ulcer; he knew there was no diphtheria, and why he should send a specimen to the Board of Health I do not know; but he did so, and the house was promptly placarded with a diphtheria sign. He called at the Board of Health office and explained the situation, and was requested to send another specimen. Later he was requested to send still another culture, which he did, and he was told the number of bacilli had decreased; after a third examination they had disappeared altogether, and the placard was removed. Two cases of this kind have occurred, to my knowledge, in the practice of men who are members of this College. A recent experience of my own was as follows: A young woman came into a hospital with which I am connected for an operation, and the day after entering developed ordinary tonsillitis. The nurses became somewhat frightened, as the patient came from a diphtheritic neighborhood. The Board of Health, after examination of a specimen, called it diphtheria, and the young woman was taken to the Municipal Hospital. We were ordered not to disinfect the room she had occupied, but were told to lock it up, and the Board of Health would attend to it in a few hours. At the end of a week they had not arrived to attend to it. Cases of this kind illustrate two features: first, the outrageous and high-handed procedure of the Board, and, second, their absolute inability and incompetency. A law carried out in such a manner as this one has been is worthless, and, good or bad, should be stricken from the records. As we cannot abolish the Board, I should like to see the law abolished; it certainly does not protect, and if it does not protect the community as represented by the hospital in the case mentioned by me, wherein lies the compensation to the individual, who must of necessity suffer at times great hardship, and, where an incompetent board is in charge, great injustice as well?

Dr. John Madison Taylor: I welcome this discussion, not because I disapprove of the placards, which have certain unmistakable advantages, but because the methods used by the Board of Health in placing them are

open to frequent criticism. From the free ventilation of the subject we may expect certain valuable modifications to be suggested which shall be in the interest of all. The proposal of Dr. Runge, of St. Louis, is a good one, though it may be scarcely practicable. He, when feeling the oppression of Board of Health domination during the illness of his family from diphtheria, proved by control experiments by animal inoculation that some of the cases showing Klebs-Loeffler bacilli were non-infectious. An incident in my knowledge is instructive: the house-placarding was supplemented by bacterial examination of the throats of several members of a large family. Many of them had not seen the patient for weeks, yet showed Klebs-Loeffler bacilli for weeks after, and these bread-winners were kept away from their important occupations. This entailed a hardship on folk whose throats were as innocent as that of any of us in whom the Klebs-Loeffler bacillus can frequently be found. All of which goes to show there may be two kinds of bacillus, the virulent and the benign. Hence the bacteriologic test alone is insufficient to lay an embargo on all who may react thereto.

Personally I have always reported my cases, and had no difficulties with the Board of Health. There are many misapprehensions of the law by the public. The placard shows that whoever goes in or out of the house does so at his own peril. It is only when insufficient precautions are or can be taken that the law enforces a complete isolation.

Dr. Hobart A. Hare: It seems to me that the remarks just made bear very little upon the question. The bacteriologist makes errors, as do all others; but the whole question is, Does placarding stop the spread of disease? I do not believe placarding houses interferes with the statistics, and I am ashamed to say that I have been told by physicians that they have neglected to report typhoid fever cases, because they had forgotten it, as frequently as they had neglected to report diphtheria or scarlet fever because of the yellow label. I do not think if the law is changed and houses are not placarded the reports of physicians will become any more valuable than they are at present. It is only fair to those who do the bacteriological work at the Board of Health to, in the first place, divide the scientific men from the political men. These examinations may result from the errors of an individual or the errors of imperfect scientific methods. The Board of Health is a political body, and unable to tell whether or not the placarding of houses decreases the spread of disease. For the College of Physicians to take official action upon the subject of reporting contagious diseases, and admit that its members disobey the law, would be an extraordinary admission for a body of men who are justly supposed to be law-abiding.

Dr. Alexander C. Abbott: Dr. Meigs has remarked that if we would inquire as to what was going on abroad and about us we would probably get some light on the subject. Since the presentation of Dr. Meigs'

paper I have made inquiry of a number of the larger cities in this country as to what steps they take in the management of these diseases. I have also looked up the question as it relates to London and some of the German and French cities. As the result of this inquiry, I find that in Boston, Chicago, Cincinnati, St. Louis, San Francisco, Washington, and Buffalo placarding is enforced. In New York it is only occasionally enforced, while in Baltimore it is not the custom to placard houses against contagious diseases. In London placarding is not practised. Their facilities for managing contagious diseases in the hospitals meet all the requirements of the case. Those cases in London which do not go to the hospitals are at once reported and are kept under the most rigid surveillance. After recovery or death the house is carefully disinfected, usually at the expense of the householder. In many parts of Germany placarding is practised. In France, I believe, they do not resort to it.

I take part in this discussion because I am interested in the question of public health. I am not convinced that placarding, as ordinarily practised, is an ideal plan; but I am certain that if we abolish it without suggesting something better to take its place we will be taking a backward step. I am well aware that in defending this practice I am fighting an uphill fight at this meeting to-night; nevertheless, I trust that the College will not agree with Dr. Meigs in his views concerning the matter. In view of the fact that so many of our larger and advanced municipalities resort to placarding as a sanitary measure, I cannot but think that there must be some good in it.

Replying to the complaint of Dr. Lainé, I have no doubt that he will be surprised to hear me say that I believe his case to have been one of genuine, though mild, diphtheria. The time is passed when modern clinicians regard this disease as of necessity always presenting the grave conditions by which it was characterized by the older writers. If Dr. Lainé will familiarize himself with modern writings, he will find that clinicians of the day are prepared to encounter atypical manifestations of a number of contagious and infectious maladies. We are now recognizing, for example, typhoid fever without demonstrable anatomical lesions; mild cases of scarlet fever are not unknown, and walking Asiatic cholera is regarded as a most dangerous element in the dissemination of this malady. I am not in the least surprised to learn that cases of sore-throat in which diphtheria bacilli are occasionally found are sometimes well in two or three days. This, however, in my opinion, makes them none the less diphtheria, nor none the less capable of disseminating the disease. I regard them as the most dangerous cases, from the stand-point of dissemination, just because of their mild clinical course, for the reason that they do not receive the attention that they would were they of graver nature.

I am quite prepared to admit that diphtheria bacilli are occasionally encountered in the throats of perfectly healthy individuals. We have

now an abundance of evidence to show that this is not rarely the case with persons in attendance upon, or otherwise in intimate contact with, diphtheria patients. They do not contract the disease, for the reason that they are not at the time susceptible to it. We must keep before us a principle of etiology, namely, that something else is required to produce a specific disease other than the micro-organism that is concerned in its causation; the individual must, through one or another cause, be predisposed to the infection.

Not only Dr. Lainé but others occasionally complain that we report from the laboratory the finding of diphtheria bacilli in cultures from patients who have never had anything the matter with them. I ask, then, why was the culture sent to us? If there was no suspicious circumstance with this patient, why was it necessary to have the bacteriological examination made of his throat? Frankly, I do not believe these statements. I believe there is always a condition of the throat that is clinically of doubtful nature when cultures are sent to us for examination; at all events, the cultures are usually accompanied by a clinical report that justifies this view.

For the protection of the public health I regard a sore-throat, no matter how mild, in which diphtheria bacilli are found, as a dangerous case, which should be isolated. It should be regarded as a case of diphtheria.

Dr. John K. Mitchell: The whole argument seems to have missed the point, as the question is, Is placarding useful? I think most of us would be in favor of placarding if it was accompanied by proper disinfection and notification on the part of the Board of Health. I have no fault to find with the bacteriological department, for their diagnosis has always been correct so far as I know; but my experience seems to be unique. I do think that the imperfections of the Health Board's inspection, the perfunctory and unsatisfactory methods employed, and the fact that the direct disinfection is done by perfectly ignorant people who are not supplied with the necessary knowledge of such things, are ludicrous. After a disinfection they state they will send an inspector, who does not come to see the fumigation, but simply to see that it has been done. I would like to know how an inspector can tell what has been done the day before. If the placarding could be accompanied by the necessary careful methods of inspection and disinfection, and proper care was taken to guard against people coming to and going from the house, I think this is all that is necessary. The only instance in point that I can think of occurred last spring, where there were three adults and one child living in the same house. One adult was a music teacher who, properly enough, could not go to her business; but one was a typewriter in the office of a single man, who was not allowed to go to her work. This was an unnecessary hardship, while in many other cases great laxity is practised.

Dr. D. T. Lainé: It is not merely the fact that the bacteriological diagnosis and mine differed, but it was the arbitrary way in which the

Board insisted upon putting up a sign on the house after the child was perfectly well. There was really no sense in placarding the house, and that is the point I wish to make.

Dr. A. C. Abbott: The circumstances surrounding the case of Dr. Lainé were exceptional. The child was sick on Saturday, the culture was taken on that day, and was sent to the laboratory, but arrived too late for examination on Saturday afternoon. The result of the examination was sent on Monday to the doctor, and when it got to him the case was better, or, as he states, well. This was an unusually long interval between the taking of the culture and the reception of the report, but the circumstances of the case rendered it unavoidable.

Dr. Horatio C. Wood: My mind was not at all made up when I came here to-night as to the advisability of placarding; but since I have listened to the arguments of those who oppose it I have been strongly impressed by these arguments toward the belief in the propriety of placarding. The concrete case reported by Professor Tyson amounts to this: If a physician had his house placarded his practice would be interfered with, because the public would have known that diphtheria existed there. Now, has not the public a right to know this and to protect itself from it? Viewed from our stand-point the argument is against placarding, but viewed from the public stand-point it is in favor of placarding. We have to-night heard a great deal about the inefficiency of the Board of Health, and it certainly is inefficient. In a certain house, not long since, I told the people the sickness was due to local sanitary disturbance. They told me their plumbing had just been gone over by the inspector of the Board of Health, and I immediately said that that was proof that the plumbing was bad. There was no trap between the house and the cellar, and there were in the house only terra-cotta pipes, which crumbled under the finger. Are we going to say that we cannot have good drainage because the Board of Health do not see to it properly? Because a physician's practice may be injured by placarding, are we going to condemn the measure in toto? I do not know yet whether placarding does more harm or good, and no one seems to be able to-night to give us definite information. To my mind it is not necessary for this College to put itself on record as being in opposition to a very large mass of professional opinion, and I think it better that it should say nothing. If the Fellows of the College are in their own minds convinced, which I am not, that placarding is a bad thing, even if properly carried out, then they should vote yea; if a man is in doubt he should vote no, even though our Board of Health is not perfect.

Dr. Alfred Stengel: I was very glad to hear Dr. Wood's remarks. He seems to me to have made the first point of importance that has been brought out in this discussion. The subject of the advisability of placarding in cases of infectious disease should be dealt with without reference to the petty shortcomings of public officers or the agents supposed to carry

out the law. The question of whether or not placarding is good, depends upon our view of contagious diseases. From the commony admitted standpoint such diseases are apt to be stamped out either by isolation of the cases, by destruction of the poison at its place of origin, or by preventing persons or things from the outside world coming in contact with the diseased individual and afterward spreading the disease outside. It is impossible to maintain strict isolation with our inadequate hospital facilities, and it is equally impossible to destroy all of the germs of disease as they arise in the diseased person. We can, however, by notification to the public prevent healthy people from coming in contact with the diseased. This is the purpose of the system, and for my own part I see no way better than placarding to accomplish this purpose. What has been said regarding the presence of diphtheria bacilli in the throats of healthy persons was not indirectly pertinent to the discussion, though it proves a point in favor of placarding. Healthy persons may carry the germs without themselves showing evidence of the disease. The fewer persons, then, who come in contact the less likely is contagion to be spread. Healthy persons carrying the germs are often as dangerous to the community as the sick, or more so, because of their greater ability to go about.

If there is any shortening on the part of officials in carrying out the system of placarding, let us attack the officials and not the system. The subject is one of sanitation and not of politics. I myself might cite instances under my own observation in which gross negligence could be charged against agents of the Board of Health, but I am not tempted on this account to condemn public sanitation or any individual measure of public hygiene. It has been said to-night that private individuals may be injured in their business by the exposure of a placard. That is unfortunate for the individual, but sometimes very fortunate for the community. In the case of a physician in whose house an infectious disease happens to occur, the public and his patients have a right to know of such an occurrence. The same applies to private homes and to shops in which infectious diseases arise. The system of placarding seems to me the only one ever suggested that will help to limit the spread of contagious disease, as far as the public authorities can have power to act. It has been said that the exhibition of the yellow placard attracts neighbors and busybodies to the house. This may sometimes be the case, but I do not believe it is often so. Most of our people are frightened and not attracted by the placard.

The whole question to my mind is simply this, Is it not right that the public should be notified of the existence in a house of a contagious disease? And is not this the best method of preventing transportation of disease from the affected house to the community? If these facts are admitted, mere matters of personal inconvenience seem paltry and are not to be considered.

Dr. James B. Walker: In considering the question does placarding

protect, Dr. Abbott read a number of letters, and I wish to call attention to the one from New York. Satisfactory answers to his questions come from them. They say, "We have lessened typhoid and all contagious diseases." As this is what we are desirous of accomplishing, may we not wisely pronounce ourselves in favor of the plan in vogue in New York by avoiding placarding where the proper sanitary precautions against contagion can be taken? Certainly, placarding does not protect, for the best report we have is from a city where placarding is only used to a most limited extent.

Dr. Joseph Leidy: Before the days of placarding I remember a very remarkable case of a child who was convalescing from scarlet fever and was isolated. The child was left in charge of a nurse, and the family rang for a messenger boy to come and amuse it. Certainly, had a placard been placed on the door, it is doubtful whether the messenger boy would have exposed himself to the contagion.

Dr. George Woodward: A short time ago I became a member of this very popular body, viz., the Board of Health. I heard of this resolution, and my first impression was that it was right, and the Board of Health should be abated as a nuisance; but I have changed my opinion since then, and one reason for it is this: A prominent surgeon of this city told me not long ago that the placarding of houses was useless, as when he had a case of diphtheria the neighbors all came in, despite the placard. This statement was, to my mind, a strong argument in favor of not only placarding infected houses, but of instituting a guard around such houses. It seems to me that an intelligent man in charge of a case of diphtheria who allows the neighbors to be present deserves to have a guard put upon himself.

Dr. S. Solis-Cohen: The greatest objection to the placard is that it diverts attention from the necessity of isolation and continuous disinfection; it also at times causes the well to be locked up with the sick, so that, in place of a single case in a tenement, there may be half a dozen.

Dr. James Tyson: I fear I did not make myself plain to Dr. Wood. My proposition contained two portions: first, that the law is a hardship, and, second, that it is useless, while the latter is the more important. It seems to me that what is being said here to-night goes to show that the placarding is not efficient, and if this be true something else should be done. It is to be expected that members of the Board of Health and those associated with them should take a somewhat different view of this question from the physician. I think Dr. Abbott would have received different replies had he written to physicians in practice instead of to officers of Health Boards. I believe thoroughly in the bacterial origin of the infectious diseases. Of course, the Klebs-Loeffler bacillus plays an important part in the causation of diphtheria, but the presence of this bacillus alone does not constitute the disease. Certain favoring conditions are necessary in order that it may cause it. We may all have tubercle bacilli within our

mouths and air-passages, but it does not follow from this that we have tuberculosis. I lay great stress upon the fact that equally efficient and less cruel measures accomplish the same end as placarding, as shown especially by the results in London and, to a less degree, in New York City, where the placards are placed on *apartments*, but not on houses, and then only in the judgment of the health officer. I am in favor of the most stringent inspections and disinfections possible, and I believe these can accomplish every object desired.

Dr. Richard A. Cleemann: I think it is impossible to decide positively whether the placard does any good or not. There are so many points connected with the spread of contagious diseases that it is difficult to give the exact value to measures of precaution. Even in matters which have been much more discussed than this, sanitarians, even eminent ones, have confessed themselves unable to estimate the real amount of good accomplished by hygienic measures. So much has been already said concerning the merits or demerits of the placard that I will only mention one direction in which it has seemed to be of service. I have more than once been called to a child suffering from diphtheria or scarlatina, have informed the mother of the nature of the disease and given directions for the little patient's isolation; at my next visit, however, to my surprise I have found the child wandering, or being carried, about the house, as though I had said nothing upon the subject. I had failed to make an impression; but this placard does, it arouses the attention violently, and with the result that the necessary precautions are more apt to be taken.

Dr. James M. Anders: Sanitary authorities are agreed that the best means of stamping out the infective diseases are thorough isolation and thorough disinfection. If placarding was properly carried out—*i. e.*, if placards were put up in every instance—that would be a step in the right direction toward a thorough isolation of the patient; but the existing law has not as yet been tested, for the reason that the public and physicians are alike inclined to conceal their cases and not do their duty.

Dr. Meigs: The law of 1895, under the authority of which the Board of Health is now acting, is very ill drawn. It places no obligation upon the Board of Health to placard houses. This aspect of the question many of those who have spoken have seemed to me to have failed to grasp. The provision is that the Board *may* placard houses, and this, of course, leaves them the option to do as is done in New York, where houses are placarded if it is thought that it would be beneficial to the public, while houses in good sanitary condition are not placarded. The same might be done in Philadelphia if our Board of Health had sufficient courage to make the proper use of its power. It is most likely that placarding does some good, but it is certain that it also does much harm. The main question, therefore, that we want to consider is whether the practice is conducive more to harm or to good, and there does not seem to be any reason why each one of

us should not be able to make up his mind and express an opinion upon this point. So far as concerns the bacteriological aspect of the question, it does seem unreasonable to suppose that a man in a laboratory, at a distance from a patient suffering with diphtheria, can be as competent to make the diagnosis as the physician who is in attendance and is able to know everything concerning the clinical condition of his patient. Our Board of Health seems to consider itself superior in authority to the State Legislature. The law of 1895 distinctly provides that no child from a house that has been placarded can, under any circumstances, go back to school until a period of thirty days has elapsed after the removal of the placard. The rules published by the Board of Health direct that under certain circumstances children may return to school in less periods than thirty days, sometimes only two weeks being required. This is certainly an unwarranted arrogation of authority upon the part of the Board.

A DESCRIPTION OF THE SKELETON OF THE AMERICAN GIANT, WITH A NOTE ON THE RELATION OF ACROMEGALY AND GIANTISM.

By GUY HINSDALE, M.D.

[Read June 1, 1898.]

It became known, five years ago, by the independent observation of Tamburini, Brissaud, and Taruffi, that the pituitary body undergoes a remarkable hypertrophy in the case of a large percentage of giants, and was probably an agent of great importance in producing these wonders of the world. In the giants that came to post-mortem examination the pituitary was found truly hypertrophied.

In the skeletons of giants that were forthwith examined, unmistakable evidences of acromegaly were found. The skeleton, and particularly the skull, of which we furnish the measurements, show this in a moderate degree. The pituitary fossa is the largest on record, measuring 27 mm. antero-posteriorly, 42 mm. laterally, and 12 mm. in depth. Thus we find that the celebrated "Irish giant," Cornelius Magrath, described by Cunningham, had undoubted evidences of acromegaly, including a huge pituitary fossa. So, also, it was found by Taruffi that the giant's skeleton which he examined in Reggio was also that of an acromegalic. Prof. Woods Hutchinson, who has published during the present year a valuable paper on this subject, estimates that from 40 to 60 per cent. of giants are also cases of acromegaly. He cites the fact that of over one hundred cases on record only one lived to old age, very few to middle life, and a majority died before the age of thirty, many deaths being due to a general failure of the vital powers or some trivial intercurrent disease imposed upon this.

"Myth and popular impression to the contrary notwithstanding, giants are a short-lived, feeble-minded, weak-bodied race, shambling in their movements, and of the mildest of dispositions. They are occasionally possessed of great power, but this seldom lasts more than a few years, just as is also seen in some cases of acromegaly."

"The position which appears to us the best to harmonize these facts is that acromegaly and giantism are similar, if not identical, disturbances of pituitary metabolism, the one beginning in early life, before the full stature has been reached and producing comparatively symmetrical results, extending over a considerable period; the other developing after maturity and expending its overgrowth force at the points of least resistance to growth, the hands and feet, nose and lower jaw. In both, the essential process is a more or less rapid overgrowth, reaching a definite limit, and soon followed by correspondingly rapid decay. The ultimate result is the same in both, the situation of the outgrowth (extremities and distal portions of appendicular skeleton generally) is strikingly similar; there is the same disturbance of the sexual functions; in fact, almost the only differences between them are in the pressure symptoms (headache, hemianopsia) and more rapid course of the adult form."

Maximilian Sternberg distinguishes two forms of giantism: first, the normal, and second, the pathological, which almost always is associated with acromegaly. In thirty-four cases of giantism examined he finds evidences of acromegaly in fourteen (42 per cent.), which shows that giantism predisposes to acromegaly; on the other hand, acromegaly predisposes less to giantism.

It is in this second class that we find prognathism and enlargement of the sella turcica. Sternberg exhibited recently, in a discussion of this subject, a typical skull from both varieties of giantism. He considers giantism and acromegaly as separate entities, and states that only about 20 per cent. of acromegalics are above 1.80 meters (6 feet) in height, and that above 40 per cent. of giants are acromegalics. Giantism, therefore, is considered by him as predisposing to acromegaly; one of their tendencies to trophic organic changes being acromegaly, nearly half the giants

die from this cause. Marie puts it this way: "Acromegaly is giantism of the adult; giantism is acromegaly of the adolescent."

As to the two types of acromegaly, there is a disposition to assume the long or giant type of acromegaly, if the disease originated in the period of adolescence; but if the onset is delayed until later life, the type will be large (Brissaud and Meige).

In a case of Dallemange acromegalic symptoms appeared fifteen years previous to observation, and for many years before that the patient had gigantic stature. After death the heart, kidneys, liver, and spleen were double and even triple the normal weight. This author considers that this enormous increase should be attributed more to the acromegaly than to the giantism. He terms it a sort of splanchnomegaly, referable to the same process as obtains in hypertrophy of the extremities.

A case described by Brissaud and Meige was as follows: The man presented nothing abnormal before the age of sixteen; he then rapidly grew larger, and at twenty-one years he measured seven feet two inches, and weighed 340 pounds. He remained well and spry until the age of thirty-seven, when his spine gave way under a strain, and kyphosis followed, so that his nipples were on a level with the anterior superior spines of the ilium.

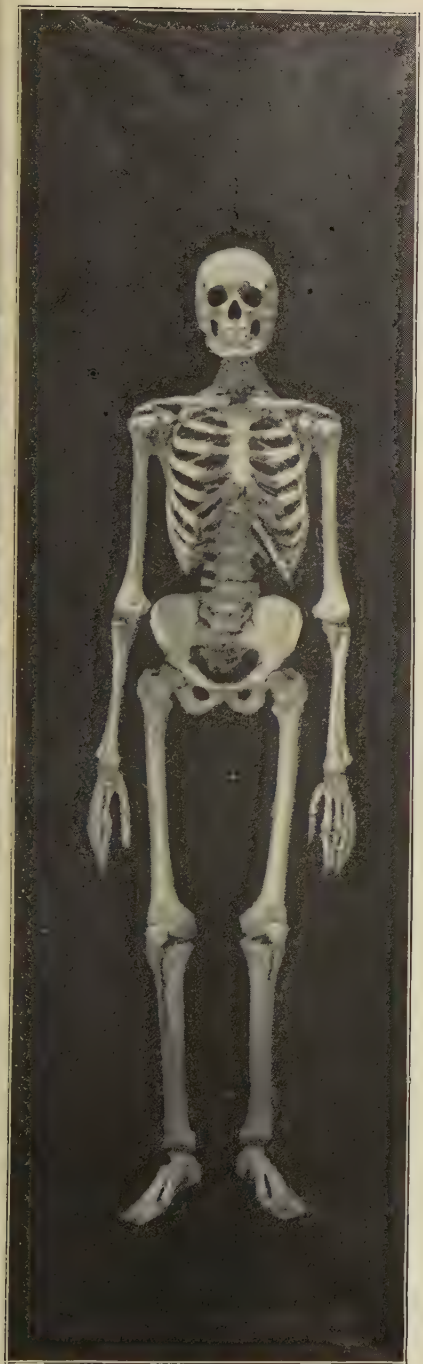
Mental dulness, debility, fatigue, bronchitis, night-sweats, and headache harassed him. The bones of the face and extremities were characteristically enlarged. Circumference at nipples sixty-two inches, and over the most prominent part of the kyphosis and pigeon-breast seventy-four inches.

The "Irish giant," Cornelius Magrath, was born in Ireland in 1736 and died in 1760, being twenty-three years old. His height was seven feet, two and one-quarter inches, as measured by the skeleton now in the Anatomical and Zoölogical Museum in Dublin. This, however, is less than the height of the skeleton we describe and less than that of Charles Byrne's skeleton, now in the Royal College of Surgeons of England, viz., seven feet seven inches.[1] The skull of the Irish giant has a cubic capacity of 1600 c.c., that of Byrne 1520 c.c., while ours has a capacity of 2320 c.c.

[1] For comparative measurements of these and other skeletons see Trans. Royal Irish Academy, 1891, vol. xxix., part xvi.

PLATE I.

FIG. 1.



Normal skeleton. Height, 6 feet 1 inch. (From the private collection of DR. GEORGE MCCLELLAN.)

FIG. 2.

The American Giant. Height, 7 feet 6 inches. (Described by DR. GUY HINSDALE.)

We will, however, reserve our comparisons until we give the description of our case in full.

It may be said that Virchow is generally quoted as believing that there is no connection whatever between the partial giant growth which is seen in ordinary cases of acromegaly and general giant growth, but most authorities, including Langer, Cunningham, and W. Hutchinson, unite in holding an opposite position.

Cases have arisen which have suggested that there is, paradoxical as it may seem, a relation between giantism and dwarfism. Such cases are those described by Mr. Jonathan Hutchinson in 1866 and by Mr. H. Gilford in 1896. In the latter case, while the patient was clearly a dwarf, there were parts that were more than fully developed, and Mr. Gilford was led by this case to the study of dwarfism and giantism. He sees a close relationship between these deviations in nutrition, and suggests the term micromegaly as descriptive of his case and others allied to it. He thinks it not impossible that the cause of acromegaly operating before birth may bring about micromegaly; for many giants have evidently owed their proportions to the former. May the one be the congenital condition of the other, or are the two opposite states?

Of the person whose skeleton we propose to describe nothing is known, with the exception of one fact—that he was a native of Kentucky. In the year 1877 Prof. Joseph Leidy was informed by Prof. A. E. Foote that the body of a giant was offered for sale, provided no questions were asked which might lead to its identification. Arrangements were soon made by Dr. William Hunt through the gentlemen mentioned above, and the body was transferred to the College of Physicians of Philadelphia, where the skeleton was prepared and mounted by Mr. R. H. Nash.

All the persons mentioned are now dead. They were never able to ascertain, or, at least, thought it prudent not to make inquiry, as to the antecedents of this giant, whose skeleton, the largest and most interesting in America, now adorns the Mütter Museum of this College.

It will be interesting to make a comparison of this skeleton, as a whole, and the individual bones composing it, with some of the famous giants of which we have records, and particularly with

skeletons of giants in London and Dublin, and with the acromegalic skeleton in Edinburgh, which has attracted world-wide attention. The author is indebted to Prof. Cunningham for measurements of these last-named skeletons, and he has endeavored so to arrange his description as to conform to the model which Prof. Cunningham has given. Not having been furnished with any name for the person whose skeleton we describe, we shall simply refer to him as the American giant.[1]

Height. It is probable that the American giant had attained the age of twenty-two or twenty-four at the time of his death. The bones seem to have attained their full development, although the epiphyseal junctions are plainly visible in all the long bones.

The spine has undergone a kypho-scoliosis which detracts considerably from the height which would otherwise exist. Taking the skeleton as we find it, the height is seven feet and six inches. This measurement includes suitable artificial intervertebral disks which were supplied in its preparation. There is a rule formulated by the late Prof. Sir George Humphrey,[2] by which we may consider the height of any individual, under normal circumstances, to stand in proportion to the length of the femur as 1000 to 275. But in our case, as in other abnormal skeletons, this rule may lead us astray; whatever the error may be in short skeletons or those of moderate height, in the case of giants the disproportionate length of the long bones, particularly those of the lower extremity, used as a basis of calculation, will lead us to a slightly exaggerated estimate of the total height. Applying this rule, however, to the American giant, we have R. 275 : 1000 : : 650 : 2363 — L. 275 : 1000 : : 666 : 2421, which equals seven feet and eight and three-quarter inches in case we estimate by the right femur, and seven feet and eleven inches in using the left femur.

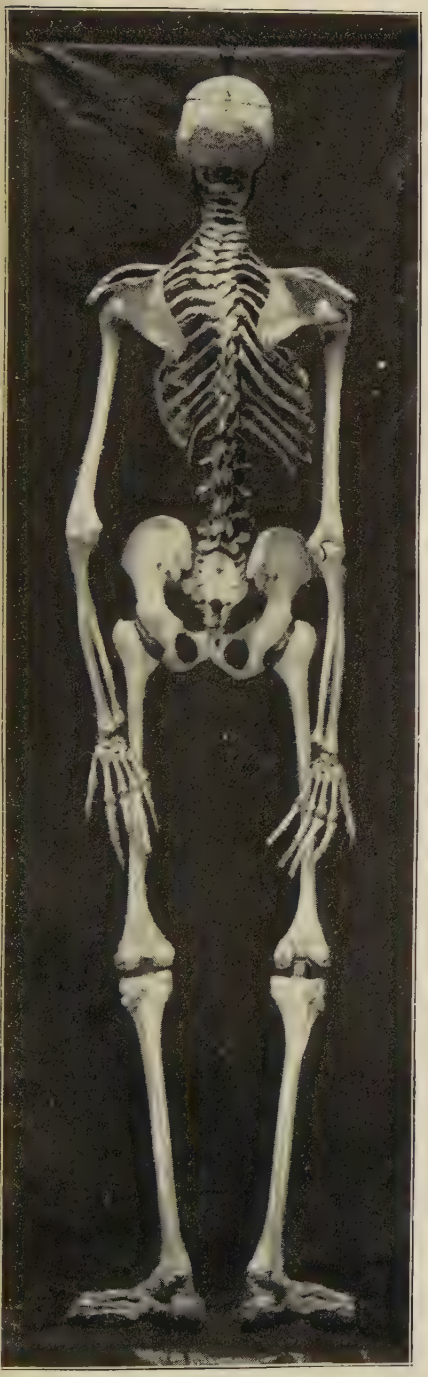
Our measurements, therefore, as given in the following table, taken from the skeleton itself, doubtless underestimate the size of the giant in life before kyphosis became extreme.

[1] The author wishes to express his thanks to Dr. George McClellan for the series of photographs which he kindly made to illustrate this paper.

[2] Human Skeleton, 1858, Table IV., p. 108.

PLATE II.

FIG. 1.



American Giant; posterior aspect.

FIG. 2.

American Giant; side view.

		Mm.	Feet, inches.
T.	An Austrian (Paris)	2550	8 $4\frac{1}{4}$
R.	Marianne Wehde	2550	8 $4\frac{1}{4}$
T.	A Kalmuck, Orfila Museum	2530	8 $3\frac{1}{2}$
T.	A Swedish Guard of Frederick II.	2520	8 $3\frac{1}{8}$
R.	Chang	2360	7 $8\frac{3}{4}$
C.	Byrne, R.C.S.E.	2310	7 7
R.	Drasal (Olmutz)	2300	7 $6\frac{1}{2}$
A.	The American giant	2285	7 6
V.	Winkelmeier, born in Upper Austria	2278	7 $5\frac{5}{8}$
R.	Thos. Hasler, Bavaria (acromegalic)	2270	7 $5\frac{1}{4}$
L.	Innsbruck giant	2226	7 $3\frac{5}{8}$
V.	Murphy (Irish), Marseilles Museum	2220	7 $3\frac{3}{8}$
L.	Berlin (Cat. No. 3040), one of the famous Guards of Frederick II.	2200	7 $2\frac{1}{2}$
L.	Lolly, Pomeranian, St. Petersburg	2195	7 $2\frac{3}{8}$
C.	Magrath (Irish giant), Dublin	2177	7 $2\frac{1}{4}$

T. Topinard. L. Langer. V. Virchow.
C. Cunningham. R. Ranke. A. Author.

The Skull. The skull of the American giant bears a fair proportion to the great size of the skeleton. There has been some discussion among craniologists as to the usual ratio of the size of the skull to that of the skeleton in the case of giants. Virchow maintains that the horizontal circumference and the various diameters of the cranium exceed the average. He states, however, that the basis cranii is relatively short. Langer holds that the head in giants is, as a rule, relatively small.

	American giant.	Irish giant.	Byrne, R.C.S.E.	Edinburgh acromegalic sk.
Cubic capacity, c.c.	2320	1600	1520	1580
Length, glabello-occipital	234	198	215	200
internal	195			
Height, basi-bregmatic	156	139	148	142
Distance, binaural over bregma	351			
Vertical index	66.6	70.2	68.8	71
Breadth, maximum	145	155	151	148
minimum frontal	128			
Cephalic index	61.9	78.3	70.2	74
Horizontal circumference	640	568	593	561
Length of foramen magnum	51	40	43	33
Breadth of foramen magnum	39			

	American giant.	Irish giant.	Byrne, R.C.S.E.	Edinburgh acromegalic sk.
Interzygomatic breadth	147	156	148	150
Intermalar breadth	124	..	..	..
Length of face, nasi-mental	148	156	137	148
Facial index	60.4	61.5	55.4	54
Orbital width	52	44	42	45
height	42	53	34	36
index	80	97.7	81	80
Palato-maxillary length	67	50	61	67
breadth	68	65	62	70
index	101.5	130	101.6	104.4

The measurements, therefore, show that we have to do with a truly gigantic skull, its internal capacity being nearly one-half again as large as in the case of the skeletons in London, Dublin, and Edinburgh. The increased capacity is chiefly due to increased length, by reason of which the skull is classed as dolicho-cephalic. The interzygomatic diameter is slightly under that of the three skulls with which we have compared it. The intermalar breadth, on the other hand, is in excess, due largely to the great development of the antrum. The frontal sinuses have the following diameters: Transverse, 7.5; vertical, 7; antero-posterior, supra-orbital, 2.4.

Pituitary fossa.	American giant.	Magrath.	Edinburgh skeleton.
Length	27	38	22.5
Depth	17	28	28
Breadth	42[1]	..	21

Face. The face is large, even in proportion to the large cranium. The air sinuses are large and give the great inter-malar measurement, and the inferior maxilla, slightly prognathous, is massive.

Vertical Depth of Face (Nasion to Chin).

	Length of face.	Stature.	Face-stature index.
American giant	148	2285	6.48
Irish giant	156	2177	7.16
Winkelmeier	149	2278	6.54
Edinburgh acromegalic	148	1830	8.08
Murphy	143	2220	6.44
Byrne, R.C.S.E.	137	2287	5.99
Normal	120	1710	7.01

[1] Between the anterior clinoid processes.

Skull of the American Giant compared with a normal skull
from the collection of Dr. George McClellan.

	Naso-alveolar length.	Naso-alveolar stature index.
American giant	90	3.93
Irish giant	96	4.40
Byrne, R.C.S.E.	82	3.58
Edinburgh acromegalic	81	4.42
Normal	73	4.26

The mandible is a large bone, as will be seen from the following measurements:

Intercondyloid	141	Width at angle	33
Intergonial	113	Width of ramus	40
Mento-alveolar	40	Angle of ramus	140°

The coronoid process rises higher than the condyloid process. The lower jaw is prognathous, so that the four incisor teeth project slightly in advance of the corresponding teeth above. All the teeth in both jaws are in place and nearly all are incrusted with tartar.

	Length of the face from nasion to chin compared with the size of the cranium. Circumference = 100.	Naso-alveolar length compared with size of the cranium. Circumference = 100.
American giant	23.1	14.0
Irish giant	27.4	16.8
Edinburgh skull	26.3	14.4
Byrne, R.C.S.E.	23.1	13.8
Average	22.8	13.8

These indices show that there is a slight excess in both the maxillary and mandibular portions of the face. The alveolar portions of the jaw are perfect, having undergone no absorption.

Relation of maxillary to mandibular portions of the face:

	Symphysial height = 100.
American giant	44
Irish giant	47.9
Byrne, R.C.S.E.	50
Edinburgh skull	56.4

The orbits are extremely capacious.

Vertebral Column. The vertebræ are subject to conspicuous alteration, but they have been so mounted as to give a correct representation of the curves which existed in life. As usual in acromegaly, we find a kypho-scoliosis, in which, however, the cervical vertebræ do not partake.

Viewed antero-posteriorly, we find a sharp curve in the dorsal

and lumbar region, with the convexity to the right. The kyphosis reaches its maximum at the ninth thoracic vertebra, resulting in a compression and absorption of the body of that vertebra. The following are the measurements of the anterior surface of the vertebral bodies:

2d	thoracic,	30 mm.	1st	lumbar,	36 mm.
3d	"	28 "	2d	"	43 "
7th	"	25 "	3d	"	45 "
9th	"	10 "	4th	"	47 "
11th	"	31 "	5th	"	50 "

Greatest width of the first thoracic vertebra 97 mm. (3.75 in.).

From the atlas to the promontory of the sacrum, 820; from the same points in a direct line, 750; from the atlas to the tip of the coccyx along the anterior borders of the vertebræ, 1030 mm.

Viewed laterally, we find the first four thoracic vertebral spines prominent in the convexity; next, the right transverse processes of the sixth, seventh, eighth, ninth, tenth, and eleventh vertebræ; then the spinous processes of the twelfth thoracic and the lumbar vertebræ. The great lateral displacement of the vertebræ brings the posterior margin of the right scapula 7 cm. behind the corresponding margin of the left, and in line with the right transverse process of the seventh thoracic vertebra.

The lumbar vertebræ are massive. The sacrum is composed of four vertebræ, instead of the usual number, five. Its width is 16 cm.; length, 13.2 cm.

The coccyx consists of three vertebræ, instead of the usual number, four.

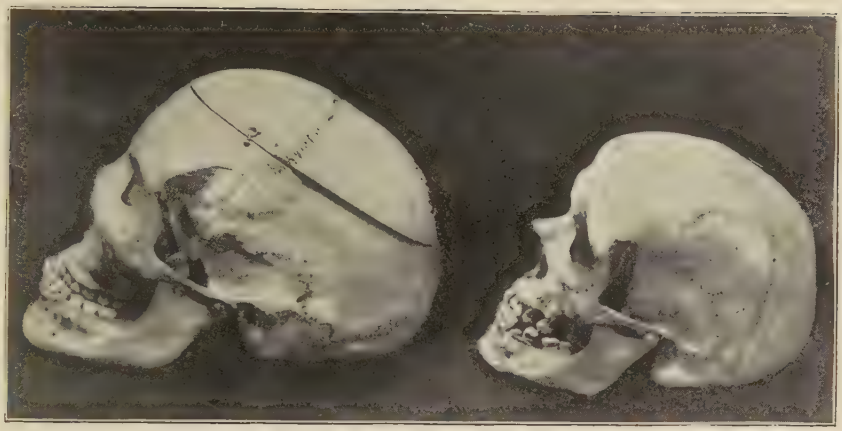
The ribs are long and narrow, and relatively straight. The seventh and eighth right ribs, measured along the under border, are 45 cm. and 43.5 cm. in length; the sixth rib on the left side, on the outer side, is 43.5 cm. long; the seventh, measured along the under side, is 43.8 cm. in length.

The sternum has a total length of 23.5 cm. It is a large, well-proportioned bone.

	Length.	Width.
Manubrium	7	8.4 cm.
Gladiolus, first segment . . .	4	4 "
remainder	8.9	5.8 "
Ensiform cartilage	2.9	2.3 "

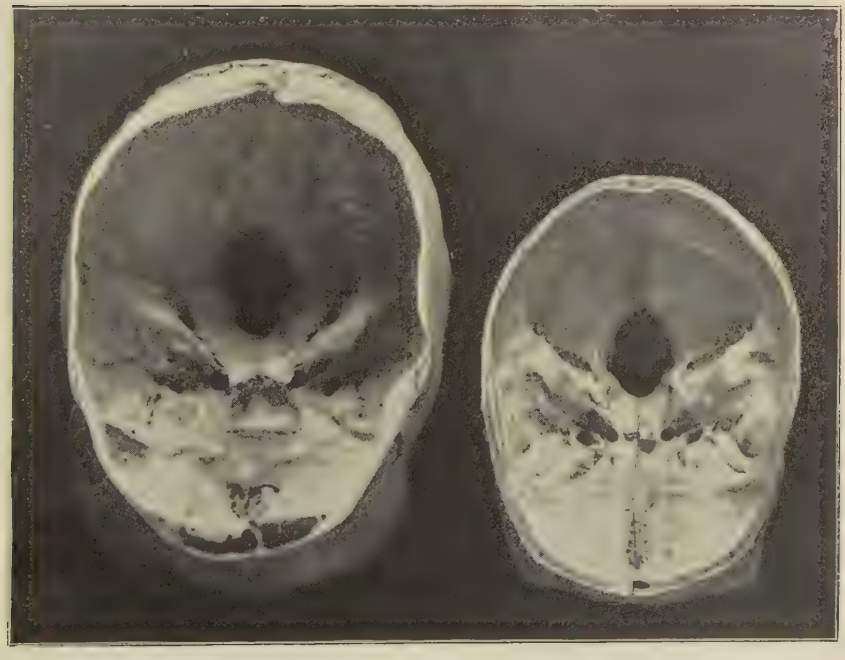
PLATE IV.

FIG. 1.



Skull of the American Giant compared with normal skull; side view.

FIG. 2.



Base of the skull of the American Giant, showing enlarged pituitary fossa, compared with normal skull from the collection of DR. GEORGE MCCLELLAN.

The thorax is large, but narrow in proportion to its depth.

Girth	(43¼ in.)	109.7 cm.
Antero-posterior diameter	43	"
Lateral diameter	30	"

This corresponds with Langer's observation that in individuals of great stature the thorax is relatively narrow. In this respect the American giant differs from the Irish giant, Magrath, whose broad chest and boldly-curved ribs give a girth of 132 cm. (52⅛ in.).

Pelvis. The pelvis is large and proportionate to the size of the skeleton. The bones are thickened at their borders and bear the marks of periosteal inflammation. Especially is this noticeable in the iliac crests and above the acetabula, which are evidently arthritic. The conformation is of the rhachitic type, judging from the increase of the measurement between the anterior superior spines and the crests.

Between the anterior superior spines	35.5 cm.
" " crests	33.5 "
" " middle points of the ischia	15.5 "
Antero-posterior diameter of the pelvic inlet	14.0 "
Right anterior oblique diameter of the pelvic inlet	17.5 "
Left " " " " " "	17.7 "
Depth of pelvic cavity	14.5 "
Height of pelvis	22.3 "

This pelvis is thus somewhat smaller than that of Magrath (Dublin) and of Byrne (R.C.S.E.). The latter have a breadth of 38.6 and 38 cm., respectively.

The cavity of the pelvis is considerably encroached upon by the convexities which mark the position of the acetabula, particularly that of the left side. The acetabula are very deep and separated by thin bone from the pelvic cavity. The bodies of the iliac bones are exceedingly thin.

Upper Extremity. *The Clavicles.* Length of each 215 mm.

The Scapulæ. These are large bones, each 267 mm. in length.

The Humeri. The right humerus is 47.5 cm. long; the left, 48 cm. The right humerus has a circular perforation in the olecranon fossa 16 mm. in diameter.

	Length of humerus.		Stature equals 100. Relation of humerus to stature.	
	Right.	Left.	Right.	Left.
American giant . .	47.5	48.0	20.8	21.0
Irish giant . . .	43.1	43.3	18.7	19.8
Byrne	45.0	43.0	19.0	18.1
Edinburgh skeleton .	34.8	33.1	19.6	18.8

Average, 19.8, Topinard.

Ulna. Right ulna, 37.8 cm.; left ulna, 38.5 cm. long.

Radius. Right, 35.4. Left, 36.0.

Hand. Length of hand from scaphoid to tip of middle finger is 25.0.

	Length of hand.	Relation to stature.
American giant	25.0	10.9
Irish giant	25.8	11.8
Byrne (R.C.S.E.)	26.3	11.3

Lower Extremity. *Femora.* The femora, though slender in proportion to the great size of the body, are symmetrical, and the shafts are well formed and not unduly curved. They vary 11 mm. in length. The right is 65.5 cm. in length; the left, 66.6. The shafts are 84 and 85 mm. in circumference for the right and left sides, respectively, and 20 mm. in diameter. The shafts are thus no thicker than in ordinary individuals. The hip-joints are markedly arthritic. The femoral heads are misshapen and the necks are deformed. The latter, instead of being circular in shape on cross-section, are semilunar; with the flat side anterior they are short and, instead of being placed obliquely, approach a right-angle in relation to the shaft. The circumference and greatest diameter of the necks are as follows: Circumference, right, 13.5 cm.; left, 13 cm. Greatest diameter, right, 5.7; left, 5.5. The condyles are well formed and bear a proper relation to the tibæ. The compact tissue is very thin at the extremities, barely covering the cancellous structure.

	Length of femur.		Girth of shaft.	
	Right.	Left.	Right.	Left.
American giant .	65.5 cm.	66.6 cm.	8.4 cm.	8.5 c.m
Irish giant, Magrath	60.3	62.4		
Byrne, R.C.S.E. .	62.5	64.2		
Edinburgh skeleton .	47.9	48.7		

Tibiæ and Fibulæ. The fibulæ curve with their convexity backward, so that the perpendicular to the chord of the arc is 47 mm. The middle portion of the shaft in both cases lies entirely posterior to the tibiæ.

	Length of tibia.		Stature equals 100. Relation of tibia to stature.	
	Right.	Left.	Right.	Left.
American giant . .	55.5	56.5	24.3	24.7
Irish giant . . .	50.6	50.4	23.2	23.1
Byrne, R.C.S.E. . .	54.1	53.7	23.6	23.4
Edinburgh skeleton .	40.2	39.2	21.9	21.4

The Foot.

	Actual length.		Compared with skeleton. S. equals 100.
American giant . . .	316 mm.	12.45 in.	13.8
Irish giant, Magrath . .	300	11.75	13.7
Byrne, R.C.S.E. . . .	317	12.50	13.8
Murphy[1]	310	12.25	13.9
Winkelmeier[1] . . .	358	14.12	15.7
J. W. Walker's case[1] . .	360	14.13	18.3

DISCUSSION.

Dr. S. Weir Mitchell: Dr. Hinsdale speaks as if he considered all dwarfs were such from birth, and I would like to ask if he does not think there is such a thing as acquired dwarfism. I am sure I have at least one such case in a woman who, up to the age of eleven years, had developed normally. At that time she had an attack of double pneumonia followed by dysentery, and from that time on did not grow.

Dr. John Ashhurst, Jr.: If the curvature of the spine was allowed for, would not the measurements be about the same as those of Sir George Humphrey? The person referred to by Dr. Mitchell had marked lateral curvature of the spine.

Dr. Hinsdale: I think Dr. Ashhurst is right about the measurements. The height of this skeleton would no doubt have corresponded with Sir George Humphrey's table, if the spine was not deformed.

One would suppose Dr. Mitchell's case was one of arrested development. The ordinary acceptation of the term "dwarf" presupposes congenital defect, ante-natal history, or early appearance of the retarded development. Rickets and other congenital disease may operate in this matter.

[1] Measured during life. (See Journal of the American Medical Association, January 23, 1897.)

A CASE OF SPONTANEOUS GANGRENE OF ALL FOUR EXTREMITIES OF THE BODY, OF VERY ACUTE COURSE AND FATAL TERMINATION, WITHOUT DISCOVERABLE CAUSE.

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[Read June 1, 1898.]

The obscure origin, abrupt onset, multiple lesions, short duration, and fatal termination of the diseased conditions about to be described, make them of exceptional interest, and therefore deserving of careful attention.

C. R., aged forty years, white, male, single, American, employed as a porter by the Adams Express Company, had always been a healthy man except that in the autumn of 1897 he was for a short time in the University Hospital suffering from some cardiac trouble. I have been unsuccessful in finding out the nature of this illness or in securing information regarding it. The present illness dated from December 25, 1897, when the patient was first seen at his lodgings at about 5 P.M., by Resident Dr. J. A. McKenna, of the Medico-Chirurgical Hospital. At this time the patient was complaining of severe prostration. He was in bed, well bundled up with clothes. When an attempt was made to count the pulse, the hands of the patient were found to be surprisingly cold. The patient made no complaint, but upon investigation it was discovered that the skin of the hands showed numerous blebs filled with clear fluid. No explanation of the condition was secured. The man had been well and working, chiefly in delivering poultry and Christmas-trees, until the day before. The doctor thought of poison-ivy in connection with the Christmas-trees, and, remembering that in cold-storage houses solutions of lead are used to aid the preservation of poultry, concluded that the lesions resulted from contact with one or the other of these substances. The patient, now that his attention was called to it, began to complain of extremely cold sensations in the hands and feet. His pulse at this time was small and fluttering.

At 7 P.M., December 26th, the patient was admitted to the hospital. He was prostrated and almost pulseless, 160 beats to the minute being counted. Whiskey was administered, and some improvement in condition was noted. He complained of one ankle, saying that he supposed he had sprained it in some way. The part was examined, but seemed normal. It was noted at this time that both feet were considerably swollen (œdematous), bluish, and very cold. The blebs upon the hands were opened and a palliative dressing applied. Clear, yellowish serum escaped from the blebs. The hands were very cold and bluish in color. Shortly after admission to the hospital the patient became restless and delirious, and, as the night wore on, became violent, tearing the dressings from his hands. One of the finger-nails and some of the epidermis were torn off with the dressings and adhered to them. Subsequently he became quiet, turned over on his side and apparently went to sleep. Three hours afterward, the doctor, happening to enter the ward to inquire about him, and learning that he was still quiet, went to the bedside to determine exactly what the condition was, and found the patient dead.

The short time that the man had been in the hospital before death made it impossible to inquire particularly into his history, and as he entered the hospital so late in the afternoon, and died the same night, it unfortunately happened that he was seen by none of the visiting staff. He was not examined physically, was by mistake sent to the surgical ward, and is entered by the resident physician upon the hospital records as a case of "poisoned hands." Eight hours after death I was called to make an autopsy.

Autopsy. The body is that of a fairly well-developed man of middle size, about forty years of age. Both hands and both feet are in a condition of moist gangrene. The disease affects the limbs symmetrically, the lesions embracing all the fingers and thumbs and extending up the dorsal surface to the third phalanges and up the palmar surfaces to the palms themselves. The right foot is involved to an extent including all of the toes, a small portion of the skin of the dorsum, and the plantar surface as far as the hollow of the foot. The left foot was less affected, the lesions being found most marked upon the great toe and the tips of the second and third toes. The ears, nose, and other features were free of gangrene. The body was cold, well preserved, with pronounced rigor mortis. The usual incisions were made.

The *heart* was of enormous size and seemed to fill up the whole anterior part of the chest. It was relaxed and flabby, and was empty except for a few clots. The *pericardium* was normal in appearance and contained a relatively normal amount of fluid. The enormous size of the heart at once suggested valvular disease, but, curiously enough, the entire interior of

the heart seemed free of disease. The walls of the organ were of normal relative thickness and seemed to be unchanged in structure. Minute examination of the valves showed the presence upon their leaflets of a few minute scattered patches of sclerotic change, insignificant and inconspicuous. No cause explaining the hypertrophy was found within the heart.

The right *lung* was intimately adherent to the thoracic wall by old adhesions. The left lung was free. Both lungs showed some hypostatic œdema, but beyond it no pathological changes.

Fig. 1.

The *spleen* was intimately adherent to the surrounding tissues and was enlarged to the size of the hand. Its capsule was thickened and presented a fibroid patch of almost cartilaginous consistency about the size of a quarter-dollar, somewhat stellate in appearance, suggestive of an old infarct. On section the scar was found not to extend beneath the capsule. The splenic substance was firm and fibrous, although congested. The appearances were easily accounted for by local inflammatory changes and congestion.

The *kidneys* were examined with particular interest as offering a possible explanation of the enlarged size of the heart. Each organ contained at least one anæmic infarct about the size of a soup-bean, and a few smaller ones. Except for the infarctions the organs appeared fairly normal. The capsule was unaltered in thickness, and could be removed without difficulty, but was probably a trifle more adherent than normal. A few congested patches appeared upon the surface.

The *prostate* gland showed a deep congestion of the left lobe, with some interstitial hemorrhage.

The *bladder, ureters, and seminal vesicles* were normal in appearance.

The *stomach* and *intestines* showed no signs of disease.

The *liver* was enlarged, nutmeg in appearance, probably from slight increase of connective tissue.

Brain and *spinal cord* showed no macroscopic lesions, but were reserved for microscopic study.

Feeling that the gangrenous changes might depend upon thrombosis or embolism, and bearing in mind that there were infarcts in the kidneys, the arterial trunks of both arms were dissected out to the palmar arches, but were found normal and empty. The nerves of the arms were likewise examined, and of the median nerve fragments were saved for microscopic examination.

The thought that the condition might possibly be infectious in nature did not present itself during the autopsy, so that no cultures were made from the organs.

From the autopsy-notes it is evident that the lesion that caused the gangrene and subsequently the death of the patient is not a macroscopic one.

The microscopic study of the tissues revealed the following:

1. *The Heart.* Few of the cardiac-muscle fibres show cross-striations. The number and arrangement of the muscle-cells appear to bear a normal relation to the tissue as a whole. The nuclei are normal in number and appearance. Some of the cells contain vacuoles. The bloodvessels are nearly all distended with blood, and here and there one finds small interstitial hemorrhages. Around these hemorrhages the tissue seems unaltered in appearance, so that it seems proper to conclude that they occurred very shortly before death. There is no sign of toxic necrosis of the tissue.

The blood within the vessels, as well as that which has escaped into the tissue, is somewhat interesting because of a marked irregularity in the size of the erythrocytes, many of which are very small.

In thionine sections the transverse striations of the cells are rather more distinct. Brownish pigment-granules in the protoplasm are seen in the cells gathered in clusters at the poles of the nuclei. Neither in the blood within the vessels nor in the extravasated blood could the presence of any bacteria be determined, though industriously sought after.

2. *The Liver.* The microscopic changes are of the greatest interest, and divide themselves into those which are (*a*) topographic, (*b*) cellular.

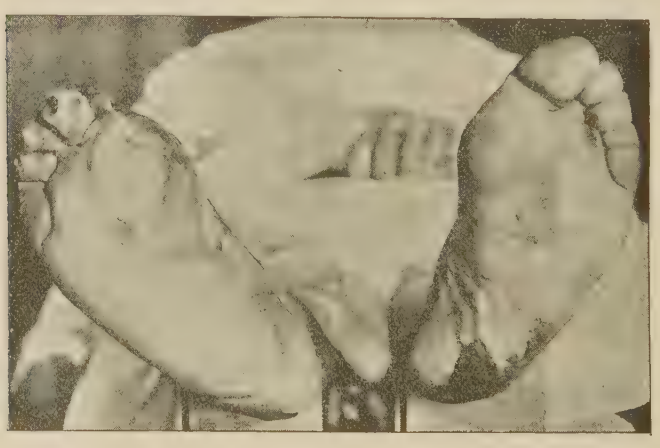
(*a*) The central veins of the lobules are sometimes empty, sometimes full of blood. The capillaries in the immediate neighborhood of the central veins are usually empty, while those midway between the central veins and the periphery of the lobules are almost invariably full of blood-corpuscles in perfect preservation. The blood is not only contained within the capillaries in this intermediate zone of the lobule, but has extravasated and saturated the tissue. The result of this lesion is an interesting micro-

scopical picture—especially in blue specimens—in which the ring of reddish-yellow blood-infiltration in the intermediate zone of the lobules contrasts strongly with the more normal tissue. Sometimes the interstitial hemorrhage begins at the central vein and extends outward nearly to the peripheral zone.

The peripheral zone shows fatty infiltration, with some degeneration (?) as well. There is very little increase of connective tissue beyond the normal, but in the fibrous tissue there are an abnormal number of nuclei and a few leucocytes.

(*b*) The cellular changes consist in cloudy swelling of the liver-cell in the immediate neighborhood of the hemorrhagic area, and fatty infiltration with possible metamorphosis of the liver-cell.

FIG. 2.



As in the heart, careful study of sections failed to reveal the presence of any bacteria in the tissue, in the blood, in the vessels, or in the extravasated blood in the tissues.

3. *The Spleen.* The spleen is deeply congested, its pulp consisting of an almost equal number of lymphocytes and erythrocytes. The trabeculæ and Malpighian corpuscles are unaltered in appearance.

No bacteria could be defined in the splenic substance.

4. *The Kidney.* A mild degree of chronic interstitial change makes itself visible by the thickening of Bowman's capsules. Here and there an entirely destroyed glomerule is seen. There is much less blood in the kidneys than one might expect to find after studying the other organs. The capillaries of the subcapsular layer are considerably distended with blood. There are occasional interstitial hemorrhages. The glomerules contain very few

erythrocytes. The intertubular arteries and veins are often full of blood. The epithelial cells of the kidney present every grade of parenchymatous degeneration, from the mildest simple cloudy swelling to the most complete destruction of the cell, the lesion not being at all evenly distributed, but scattered so that many fields of microscopic vision will appear quite normal, while neighboring fields show quite complete cellular dissolution. If any rule for the destruction of the cells could be made, it might be that the distal convoluted tubule, irregular and collecting tubules had suffered most. Probably the greatest destruction has occurred where there is capillary congestion. No fatty metamorphosis is present. Very few of the tubules contain casts. There is no catarrhal tendency about the lesion. The glomerules are quite normal in appearance when not altered by the chronic interstitial changes described above.

Specimens most carefully examined for the presence of bacteria failed to reveal the presence of any.

5. *Nervous System.* Dr. William G. Spiller became interested in the case when I first reported it to the Pathological Society of Philadelphia, February 15, 1898, and kindly consented to study the nervous tissues which I sent him. From his letters reporting what studies he had made, I quote the following:

"Portions of the median nerve, hardened in Müller's fluid, have been 'teased,' stained in a 1 per cent. solution of osmic acid and later on in acid fuchsin, and the nerve-fibres studied individually. Nothing pathologic was detected. The myelin remained unstained by the osmic acid, and the axis-cylinders appeared normal. Sections cut with the microtome and colored with Delafield's hæmatoxylin and acid fuchsin, present merely normal tissue.

"The cells of the spinal cord, when the method of Nissl is employed, appear normal; the chromophilic elements are well stained and have their normal form and position and the nuclei are centrally located. No hemorrhages or round-cell infiltrations are found within the cervical or lumbar enlargements."

The brain was studied by Dr. L. C. Peter and myself, and no important pathologic alteration observed. There was marked congestion of the vessels, but no interstitial hemorrhages. The chief interest and most obscure feature of the case is its etiology.

1. *Cardiac Weakness.* I have been unable to find that gangrene of the extremities occurs from *simple weakness of the circulation.* This was, however, a pronounced feature of the case. The pulse was exceedingly rapid and very feeble. The hands and feet were cold and purplish. These conditions all seemed to occur together

with the development of the gangrene, and do not seem to have preceded and led up to it.

2. *Arterio-sclerosis*, with calcification of the vessel-walls, is a common cause of gangrene in old age, and very frequently leads to a symmetrical involvement of the lower extremities, and rarely to gangrene of the fingers. The patient under consideration was but forty years of age, was without diseased arteries, and was suddenly attacked by an acute moist gangrenous process contrasting markedly with the well-known senile form of the disease.

3. *Frost-bite* may be followed by either moist or dry gangrene, usually the latter, and may affect all the extremities of the body, together with the exposed features. Frost-bite, however, is productive of gangrene in one or the other of two ways: first, by causing a prolonged vasomotor contraction that causes the death of the part minus its blood; second, by contraction followed by paralytic dilatation of the bloodvessels, with death and freezing of the part containing its blood. To produce either condition very cold weather is required, and a rather prolonged exposure necessary. The weather preceding and during this man's illness was, however, quite moderate, and would scarcely have frozen the extremities of one exposed for hours in a drunken stupor. We learn that C. R. was a temperate man, regular in his habits, and had not been exposed to cold. The effects of the cold poultry that he is said to have handled might possibly have damaged the fingers, but could not possibly have operated upon his feet.

4. *Embolism* must be thought of especially, as there were abnormalities of the heart and kidneys. It is, however, difficult to understand how an embolic condition could simultaneously affect all four of the extremities. Furthermore, search for emboli in the arteries was fruitless and there were no thrombi or emboli in the arteries. Graybill (*Virginia Med. Monthly*, 1881–1882, viii. p. 355) has reported a case of spontaneous symmetrical gangrene occurring in a young child as a result of embolism. In this case there was no thrombosis.

5. *Raynaud's Disease.* In the absence of other adequate explanations, it was this affection that suggested itself to me most strongly. There were, however, certain peculiarities which the

case did not present in common with the vasomotor cases. The gangrene in Raynaud's disease is *dry gangrene* resulting from the cessation of arterial circulation in a part. It usually is paroxysmal and is very frequently the result of an unusually violent one of a series of frequently repeated attacks. It commonly affects the fingers of both hands, sometimes the toes of both feet, sometimes the fingers of one hand and the toes of the foot of the same side. A review of the literature failed to bring to light any cases of Raynaud's disease in which both hands and both feet were affected simultaneously.

Moist gangrene could only follow Raynaud's disease under conditions similar to those rare cases in which it follows frost-bite—*i. e.*, cases in which the vaso-constriction, leading to gangrene by shutting off the blood-supply, was succeeded by a vaso-dilatation of paralytic (?) nature which allowed an unusual flow of blood through the part.

The case under consideration, however, had had no paroxysms of local anæsthesia or asphyxia, and suffered from an insidious form of moist gangrene in which, while it is true that the extremities were very cold and pale, they were not extremely pale and bloodless.

That the case terminated fatally is not opposed to the diagnosis of Raynaud's disease, as numerous fatal cases of it are on record.

6. *Trophic disturbances*, caused by the disease of the central and peripheral nervous systems, are not infrequently followed by gangrene and necrosis. These lesions, however, do not present themselves unexpectedly as the first signs of disease of the nervous system in healthy persons, but usually are changes that come on late in the course of well-marked affections.

It is scarcely possible that the symptoms presented by this patient form part of the symptomatology of a new disease of the nervous system, inasmuch as the studies of the spinal cord and nerves by Dr. Spiller, and of the brain by myself, show no changes of magnitude to explain the lesions.

The angio-neurotic gangrene of Billroth and others affects individuals in early life, but is an affection of prolonged duration requiring amputation. It is probably due to arterio-sclerotic changes.

7. *Diabetes* is not infrequently accompanied by the development of gangrene, which, however, usually is irregularly distributed, and sometimes occurs in local patches. The literature contains abundant illustration of this, but I was able to find but one case, reported by Brisvert (*Journ. de Méd. de Bordeaux*, 1887–1888, xvii. 134), in which the lesions affected extremities of the body symmetrically, and in this case there was thrombosis of the abdominal aorta and the iliac arteries to explain it. No examinations of the urine were made before the death of the patient, but shortly after death he was catheterized, and three independent observers failed to find either sugar or albumin in the urine.

8. *Albuminuria* is not infrequently associated with gangrene, the exact relationship of the two conditions to each other not being very clear. Cases are reported by Debove (*Bull. et Mém. Soc. méd. des Hôp. de Paris*, 1880, 2 s., vii. 78–82), and by Roque (*Thérap. Contemp.*, Paris, 1882, ii., 689), in which the limbs were symmetrically affected. Gangrene sometimes follows œdema, but usually only in connection with the external genital organs of the male.

9. *Toxæmia. Saturnism* is rarely accompanied by gangrenous lesions. Sainton (*France méd.*, Paris, 1891, vol. xxviii. p. 221) has reported a case of symmetrical gangrene of the extremities depending upon lead-poisoning.

No examinations of the urine for lead were made in this case. There is no history of lead-colic, wrist-drop, or blue lines on the gums, and it is improbable that the man, not having by occupation been particularly predisposed to it, should have suffered from so severe a form of the intoxication.

Ergotism is a cause of gangrene which is rarely seen in this country. It usually occurs among the poor agricultural classes of European countries, and makes its appearance after wet seasons, in which the rye is spoiled by "smut." It is more or less epidemic, and the cases occur in groups. It leads to a dry form of gangrene, which commonly affects the members symmetrically. The course of the disease is tedious. Only extremely bad cases are fatal. Ergotism seems to be out of the question in this case, as the man lived in this city, led the common life of citizens, ate

wheat instead of rye bread, suffered from moist gangrene, and died with comparatively little invasion by the gangrenous process.

Infection. Typhoid fever is, in rare instances, followed by gangrene, and one case is recorded by Richard (*Bull. et Mém. Soc. méd. des Hôp. de Paris*, 1880, 2 s., xvii. 106–110) in which such a lesion affected the extremities of the body symmetrically.

Before the days of good sanitation and antisepsis in surgery, the infectious gangrene called hospital gangrene was dreaded. Its appearance will be recalled by the older surgeons, and presents no similarities to the case under consideration.

Traumatism, one of the most common causes of moist gangrene, need scarcely be mentioned, as the patient had met with no accidental injuries.

Two similar cases are on record, brief accounts of which I think it well to give. The first is reported by Thomas Camps in the *British Medico-Chirurgical Review*, July, 1855, p. 196.

J. G., laborer, aged twenty-five years, five feet and nine inches in height, well formed, was reduced in vitality by an attack of double pneumonia in December, before the present interesting illness began. In April, 1854, while there were still some signs of incomplete resolution remaining in the chest, pain and numbness of the left leg and foot were observed. A small patch of eruption was next noticed on the calf of the leg, slightly raised above the skin, and not mingled with any vesicles. There was no heat of the surface, though the patient complained of a sense of burning accompanied by formication. There was nothing abnormal in the appearance of the limb to account for the constant and intense pain which continued day and night without being relieved by any form of opiate, though given in large doses.

After a few days the foot and lower part of the leg became cold, nearly void of feeling, and evidently in a state of approaching gangrene, which soon showed itself unequivocally. The parts became black and so shrivelled as to give the idea of nothing intervening between skin and bones. About the time sphacelus had taken place, the other leg and foot became affected in a precisely similar manner, and, in succession, both hands, the ala of the right nostril, and a small portion of the upper part of the helix of each ear. The mental powers became much enfeebled.

At the beginning of the trouble the urine had a specific gravity of 1011, descending to 1006 as the case progressed. The urine was pale in color and either neutral or feebly acid in reaction. It deposited little sediment. At first the urine contained albumin, but as the case progressed the albu-

min diminished. No sugar was present at any time. The eruption mentioned constituted an interesting feature of the case, beginning early and continuing throughout the course of the disease. It was abundant on the knees, shoulders, elbows, and on the skin covering the lines of the tibia and ulna. The face had many spots upon it. They were present on the nose, the upper part of each ear, and on the penis. Indeed, no part of the body appeared to be entirely free from them. The eruption was attended by much itching. The spots were generally present in small patches, varying in form. They differed from petechiæ in color, being of a redder tint, and were slightly elevated above the level of the skin. On fading, they left in some places merely a dark stain, in others desquamation took place, or incrustations of a dark color were formed. On the nose and ears sloughing sometimes took place. When the gangrenous tissue began to separate, an offensive odor developed. The bones became exposed and one after another of the bones of the legs were sawn through. By November 12th the condition of the patient was good. He had gained flesh and ate and slept well. There was no longer any pain. The pulse was natural, there were no abnormal sounds over the heart. The specific gravity of the urine had increased to 1017; it was acid in reaction and showed a trace of albumin. The sores on the nose and ears had healed perfectly. The thumb and forefinger of the left hand had separated at the middle of the first phalanges and the stumps had cicatrized. The right thumb and forefinger had also separated at the same point. The remaining fingers all detached at the joints between the first and second phalanges, leaving the former completely denuded for their length. The legs have not healed, as the bones still project from the stumps.

May 24, 1855. The patient, J. G., is now in perfect health and is fat and florid, all of the wounds having healed except the lower end of the tibia of the right leg, which is not yet detached, though its separation is proceeding.

In reviewing the details and course of this case, Camps discusses the possible relation of ergotism to the lesions. While not expressing himself positively in regard to it, Camps evidently inclines strongly toward ergot as the etiologic factor.

The second case occurred in Philadelphia, and is reported by Bernard Henry in the *Philadelphia Medical Examiner*, vol. xii. p. 129.

J. C., a widow, aged forty-two years, a seamstress, with dark hair and eyes, was a native of Maryland. Her life had always been irregular and dissipated, and at times she had been very intemperate. She had been treated for syphilis at Blockley. She had nine children and frequent abortions intentionally produced. In the summer preceding admission to the hospital she had had persistent diarrhœa. On November 9th, after

doing some washing, she felt a stinging sensation in the hands and feet, which were unusually sensitive when scratched, and assumed a dusky red color which became more livid and intense up to the date of admission to the Episcopal Hospital, November 22, 1855. The case was thought to be one of purpura, to which it bore a strong resemblance. Upon admission to the hospital the hands and forearms for about one-third of their length were of a leaden hue, deepening toward the fingers, which were black, dry, and shrivelled in appearance. The feet and lower third of the legs were in a similar state. The tip of the nose and the skin over both patellæ were of a dusky color, as though brushed over with bronze paint. The pulse was 80, quick and strong; the intellect was acute. The extremities were icy to the touch and devoid of sensibility. Movement gave pain and the weight and warmth of the bedclothes could not be borne. The cartilages of the ears showed the beginning of a similar change. On November 24th no line of demarcation had formed; the gangrene had extended higher up. On November 26th vesications filled with a dark-red, serous fluid have made their appearance. The urine is of a high color, has a reddish tinge, an alkaline reaction, and contains mucus and purpurin. The specific gravity is 1016. On December 3d the parts are quite black and dry, distinct lines of demarcation have been established. A slight odor is for the first time distinct. On December 20th the dry parts are like an Egyptian mummy. They are united only by bone and tendon. On December 26th the right hand was amputated. On December 28th the left hand was amputated. On January 13th, for the last two days the patient has been sinking. On January 14th she was comatose and died.

An *autopsy* was held upon the body of this patient, but gave little important data. It is said that there was a condition of general bloodlessness. The venous system was full of dark, black, thick blood. There was a tendency to fatty degeneration of the heart, which was engorged. The vessels appeared to be sound up to the line of demarcation.

In the general considerations appended to the study of the case, Dr. Henry notes the resemblance that the case bears to ergotism, but regards it as scarcely possible that ergot is the etiologic factor, as the patient always was able to secure an abundance of good food.

The three cases present a single common lesion—the gangrene. They may, however, be closely related in etiology. When I reported my case to the Philadelphia Pathological Society, January 27, 1898, Dr. W. G. Spiller remarked that "the short duration of the illness, the symmetrical involvement of the distal portion of all four limbs, the numerous hemorrhages in the liver, and possibly the round-cell infiltration, are suggestive of an acute infectious

process." At the time of making the autopsy, and indeed up to the time of Dr. Spiller's remark, I had been looking for some kind of vascular or nervous condition that might account for the lesions. The microscopic changes in the organs I had attributed to secondary infections of the internal organs by bacteria from the gangrenous extremities. Much subsequent thought and careful study of the histologic changes present have, however, brought me to think with Dr. Spiller that we have to do with a case of profound toxæmia, probably of micro-organismal origin, and with disturbances of the internal organs evinced by the inflammatory and hemorrhagic lesions, and of the limbs, manifested by the gangrene. It is remarkable, though, that in a previously healthy man—or reasonably healthy man—such an infection and intoxication could occur and lead to such extreme changes and death in so short a time. It is also interesting that such an infection could take place without any external accountable lesion.

I regret exceedingly that, owing to the conditions under which the autopsy was made, no bacteriologic study of the case was made. It is, of course, a question whether it would have thrown any light upon the case, as a most careful study of the tissues fails to disclose the presence of any contained bacteria.

It will be remembered that Camps' case followed a double pneumonia, and Henry's a prolonged diarrhœa, and that gangrene has been seen to follow typhoid, and it would not be erroneous to conjecture, now that we have come to realize that the pneumococcus is capable of exciting meningitis, otitis, endocarditis, pericarditis, ostitis, osteomyelitis, parotitis, etc., and that the typhoid bacillus and streptococcus present similar lesions, that the micro-organisms had distinct etiologic significance in all three cases.

I have said that the lesions suggest a micro-organismal intoxication. Other intoxications, such as *saturnism*, present lesions of the internal organs similar to those of this case, and also occasionally are causes of gangrene. I remember seeing experimental lead-poisoning produced in guinea-pigs and rabbits in Heidelberg, by Stiglitz, characterized by interstitial hemorrhages very similar to those of this case of gangrene. It is, however, much more easy to eliminate lead than bacteria as etiologic factors, and the prob-

abilities are that the case is one of rapid infection with subsequent profound intoxication, and that the circulating toxin is the cause of the internal hemorrhagic and external gangrenous lesions.

DISCUSSION.

DR. RICHARD A. CLEEMAN: I believe some French physicians have attributed gangrene to malarial poisoning.

DR. JOHN ASHHURST, JR.: I reported a case of gangrene some years ago, following typhoid fever, in which both feet and the scrotum were affected, but the gangrene was of the dry variety. The history of this case points to infectious disease, and the patient really died from the same cause and not from the gangrene. The gangrene was simply an incident of the rapid course of the disease.

DR. MCFARLAND: I do not know anything about the relation of gangrene to malaria, not having met with any cases of the kind in my reading.

A STUDY IN THE PHYSIOLOGY OF THE NEW-BORN.

By W. REYNOLDS WILSON, M.D.

[Read November 2, 1898.]

The independent function of the infant organism is first established by the act of respiration. Although the supply of oxygen is insufficient for the new-born infant, the mechanical stimulation of the atmosphere occurs so abruptly after birth that it is probably effective in inducing respiration before the need of oxygen is felt. The first respirations are followed by changes both in the blood-composition, as shown in the heightened color of the peripheral circulation, and in the muscular tone of the infant. Chemically, the interchange of gases in the lungs is proportionately greater in the infant than in the adult. This functional activity is significant, as the pulmonary capacity is lessened by the encroachment of the liver, the relatively increased size of the heart, and the presence of the thymus gland; also by the relatively lessened alveolar space. The respirations vary in frequency and depth, so that neither a long interval between the respirations nor shallowness in breathing indicates abnormal function. The average frequency is thirty-five to the minute. The respiration is diaphragmatic in type.

In connection with the increased output of carbonic-acid gas, mentioned above, is to be noted the increased rapidity in the circulation observed in young infants. (Uffelmann.) The latter condition, when considered in connection with the excitability of the infant's circulation, serves to explain the sometimes unusual frequency in the pulse-rate. The process of digestion, disturbance from sleep, and irritative causes not due to morbid conditions are

sufficient to increase the pulse-rate. The average frequency is 135 to the minute.

The Blood. The more carefully the blood of the new-born is studied the more evident it becomes that its condition is transitional between that of the fœtus and of infancy proper. It appears, even beyond this, that the organization of the blood at this period depends upon a special tissue transformation characteristic of this time of life. The changes which occur in the blood of the fœtus after the middle of gestation are not only continuous during the first weeks of extra-uterine life, but are augmented by the special metabolic influences in the new-born. The ordinarily accepted points of difference from adult blood are as follows:

First, the amount of blood: the relation of the weight of the blood to the body-weight in the adult is 1 to 13, while in the infant it is 1 to 19.5. (Ballantyne.)

Second, the quantity of hæmoglobin, there being a proportional increase in the blood of the new-born as compared to that of the adult.

Third, the specific gravity: Rotch places this at 1065, whereas Ballantyne and Scherenziss place it somewhat below that of adult blood (1055). This difference arises probably from the fact that, in the first place, the serum is of markedly lower specific gravity at birth than in later life, and, secondly, there is a diminution of specific gravity occurring rapidly in the first three weeks of life. Rotch also calls attention to the fact that the increase in hæmoglobin and the increased specific gravity are coincident.

Fourth, the coagulability : there is probably a tendency (Kruger) to retardation in coagulability, due to the interference in the retrograde changes in the leucocytes. Petrone asserts (*Journal American Medical Association*, October 9, 1897), on the other hand, that the existence of the blood plaques as a normal morphological element in the blood of the new-born prevents coagulation.

Fifth, the increase in the number of red corpuscles (erythrocytes) at birth and within the first twenty-four hours after birth, as compared to the number in the period succeeding new-born existence.

Sixth, the presence of the nucleated variety of red corpuscles, especially the microcytes.

Seventh, the increase in the number of white corpuscles as compared to the composition of normal adult blood.

In addition to this we have the physical phenomenon of the lessened tendency of the red corpuscles to form in rouleaux, observed by some authors.

The origin of the white corpuscles, according to Ziegler, occurs through a process of division in original cells in the lymphadenoid tissues of the lymph glands, the spleen, and the intestinal tract (Rotch).

The origin of the red corpuscles occurs in embryonic life in the entire vascular system; later on, in the liver, spleen, and bone-marrow, and, finally, in the last-mentioned alone.

The destruction of the red corpuscles takes place, as far as is known, in the liver. Osler calls attention to the fact (which has a special bearing upon the causation of icterus in the new-born) of the bile pigment originating in altered hæmoglobin, possibly due to the destruction of the red corpuscles.

The chemical constituency of the blood of the fœtus further differs from that of the adult blood in that it contains relatively more sodium and less potassium.

Digestion. The secretion of saliva in the new-born is unnecessary to the digestive process, inasmuch as the character of the food does not require the specific action of ptyalin. As confirmative of this we may note the absence of saliva in the mouth of the new-born. Foster states that the amylolytic ferment in man, ptyalin, exists in exceedingly small quantity in the saliva, even to the extent of preserving its diastatic quality in almost unlimited dilution. When we consider this in connection with the fact that an infusion of the parotid gland from the new-born is effective in diastatic action we may doubt the earlier observations to the effect that the saliva of the new-born is entirely free from diastatic ferments. Comby asserts that, although the saliva is inactive in the mouth in infants, it becomes active in the stomach when swallowed with the food during the first period of digestion, before the full secretion of hydrochloric acid. We may therefore account for the digestion of starch in suckling children by this fact. Whatever may be the quantity of saliva swallowed, however, it is not needed

for diastatic action under normal conditions of feeding, up to the period of dentition, for even at this time the saliva is drained away from the mouth rather than swallowed.

The limited capacity of the infant's stomach, the character of the nourishment, and the undeveloped musculature of the organ are modifying elements in the digestive process at this period. The milk which is taken into the stomach might be readily propelled into the duodenum by reason of its fluidity, and there undergo absorption, were it not that it is retained in the stomach until it becomes curdled by the precipitation of casein, the latter being afterward digested by the products of the gastric secretion, pepsin and hydrochloric acid. This precipitation of casein depends upon a special ferment, as yet not differentiated from among the elements of the gastric secretion, although there has been an attempt to attribute this action to the presence of lactic acid, produced from sugar of milk by ferment action. In reference to the rôle played by hydrochloric acid in the infant's stomach, it is interesting to note the observations of Comby, who asserts that hydrochloric acid is secreted both during and after digestion, and that after the completion of digestion its use in the stomach is to vitiate the effects of the bacteria, which, introduced from the mouth by the swallowing, are present in the empty stomach.

The fact that colostrum is less rich in casein than is milk modifies its digestion in the new-born during the early period.

The examination of the gall-bladder in an infant dead at term discloses a large amount of bile distending the viscus. This, together with the presence of the thickened biliary secretion in the large intestine, in the form of meconium, as well as the comparatively large size of the liver, denote the active function of the latter organ. The bile is the only digestive secretion that passes actively without the ingestion of food, as shown by the presence of meconium in the intestine at birth.

The further supply of digestive secretion within the small intestine is furnished, to a small degree, by the glands of Lieberkühn and Brunner. These glands are poorly developed in the new-born, and their action is not essential to infant digestion. The alimentary tract is comparatively longer than in adults, so that the action

of the digestive secretions within the intestines is correspondingly longer than in adults, so that the action of the digestive secretions within the intestines is correspondingly prolonged. On the other hand, the feeble peristalsis and infrequency of the valvulæ conniventes decrease the absorptive surface of the intestinal tract.

The alimentation of the new-born infant is deferred until after the establishment of lactation. Before this the time is spent in complete rest, the infant sleeping during the physiological preparation of the digestive system. Meanwhile the hepatic secretion assumes its proper status and the lower bowel is emptied of meconium. Such preparation is furthered by the appearance of colostrum and the beginning of suckling.

Alimentation is either furthered or modified by certain conditions. In the first place, the period of satisfaction of the infant's appetite corresponds to the time necessary for complete stomachic digestion—that is, one and three-quarter hours. If the infant is at rest this process progresses normally. As bearing upon the normal status of digestion, we may mention, first, the position of the infant in nursing; second, the nervous influences dependent upon the infant's surroundings; third, the condition of the digestive system, as to the condition of the bowels and capacity of the stomach; fourth, the state of the infant's nutrition.

Secretion by the Kidneys. The function of the kidneys is established in fœtal life, and the bladder at birth usually contains urine. The discharge of urine in the new-born is commensurate to the activity of metabolism; for the first two days, before the bodily function is established, the amount of urine is scanty. After that it increases until the end of the first week, when it reaches its maximum in infancy—that is, in relation to the body-weight. This increase in quantity is accompanied by a proportionate increase in the quantity of urea. The actual quantity of urine voided, however, is due to the watery constituency of the normal diet and is modified by the condition of the skin and activity of the bowels.

The urine is highly colored and is frequently voided, although micturition often occurs with great irregularity, dependent upon the conditions mentioned above. In the first few days there occurs a

deposit of urates and uric acid, causing a reddish-yellow stain on the napkin. The reaction is highly acid. The specific gravity is high for the first two days, on account of the small amount of liquid ingested. It is usually lowest at the end of the first week.

The Functions of the Skin. At birth the skin is covered with a whitish layer of sebaceous material mixed with lanugo and epithelial scales, the vernix caseosa. Its function in utero is to preserve the skin from the macerating effect of the liquor amnii, and during labor it serves as a lubricating material to favor the expulsion of the child. This material possesses a certain tenacity and is apt to remain in the deeper folds of the skin, especially in the groin, and when mixed with dirt and acted upon by the micro-parasites of the air undergoes decomposition (Uffelmann).

The development of the sudoriparous glands in the new-born is imperfect, while, on the other hand, the sebaceous glands are active; this is especially seen in the secretion of sebaceous material on the scalp. From the fact that there exists a high degree of vascular dilatation in the skin of the new-born we are not warranted in inferring that the secretion from the sudoriparous glands is necessarily active. Foster states that the sweating activity of the skin, like that of other glands, is usually accompanied and aided by vascular dilatation. At the same time, from our knowledge of the effect of stimulation of the central nervous system in producing activity in the sweat glands, we are led to believe that special secretory nerves govern such secretion independently of vascular supply.

Transpiration, denoted by the insensible perspiration, is estimated variously by different authors. Bouchaud places the weight of the matter thus leaving the body daily at 55 grammes, and Uffelmann at 90. The sensible perspiration is wanting in the new-born, although a certain variation in this is observed.

As to the absorptive power of the skin, the lymphatic circulation in the skin of the new-born is notably active, and particles of vernix caseosa are sometimes to be found filling the spaces of the lymphatic zone of the corium.

Desquamation, in the form of a fine scaly exfoliation of the superficial epidermal layer, occurs, beginning on the fourth day

and continuing until about the fortieth. It is most marked on the back and extremities, especially the lower.

The Function of the so-called Ductless Glands. *The Thyroid.* The predominating fact in reference to the histology of the thyroid is the presence of the so-called acini, or follicles of the gland, which are lined with endothelium and columnar epithelium and distended by colloid material.

The chemistry of the gland in the new-born, as compared to that of the adult, reveals a relative diminution in the proportion both of the iodine per gramme and of the total amount of iodine.

The modern theories—namely, first, as to the influence of the glandular secretion upon the metabolism of the tissues in neutralizing the toxic action of imperfect waste material, and secondly, of producing a secretion which favors metabolism, and upon which the latter depends—cause us to expect a participation of the secretory function of the gland in early life. It is therefore likely, in view of the comparative absence of secretion of colloid material, that nature has partially provided for the necessary functional activity of the gland in its relatively larger size in the new-born; although, on the other hand, the rather marked increase in the quantity of iodine in the gland after the first two weeks of extra-uterine life shows that the activity of the gland is deferred until this time. Before birth the thyroid of the mother probably performs the function of secretion for both herself and the child.

The blood-modifying function of the gland is probably more prominent in the new-born, as the distinctive changes in the organization of the blood at this period would seem to demand. As bearing upon this point we may cite the fact that leucocytes are found in excess, comparatively to those in the arteries, in the veins from the thyroid, and that in the colloid material of the acini are to be found degenerated red blood-cells.

The Thymus. From its structure the thymus gland is essentially a part of the lymphatic system. The presence, however, of the concentric corpuscles in the midst of the adenoid tissue, in the cells of which, and in cells in the vicinity of which, are found hæmoglobin, denotes the influence of the gland upon the blood-forming function of the body. The question of the status of the

thymus gland in the process of blood disintegration is as yet undecided, Kolliker maintaining that the hæmoglobin granules and colored blood-corpuscles found in the lymph cells issuing from the thymus are absorbed as a consequence of blood disintegration in the gland. Watney combats this theory, asserting that the hæmoglobin issuing from the gland enters into the primary composition of red blood-cells. Whichever position may be held in reference to the adult, it is likely that the thymus in the new-born is actively engaged in the formation of blood-corpuscles. There are more leucocytes discharged in the vessels proceeding from the thymus than are found in the arteries and lymphatics entering the gland.

Small quantities of the iodine-containing alkaloid have been found in extracts of the gland by Baumann.

There is a possibility that the thymus may have an inhibitory action on the thyroid secretion (Owen). It is at least interesting to note the counterbalancing development of these organs, the thymus giving place to the thyroid in their comparative development as the child grows.

The Spleen. The spleen, unlike the thymus gland, is not an organ whose full development and function are prenatal; it is more actively engaged in the function of blood-making, in the sense of its giving rise to both white and red corpuscles, in new-born life. There is a possible relation between the production of hæmoglobin in the spleen and the proportions of iron salts found in the organ. It is supposed not to be a blood-disintegrating organ (W. H. Howell).

The Suprarenal Capsules. These organs are supposed by some to exert an influence upon the maintenance of muscular tone (Oliver and Schafer). By others they are considered as influencing the secretion and destruction of the autotoxins the result of metabolism.

The Function of the Nervous System. The state of the nervous action in the new-born is that of marked irritability, shown in the frequent and easily-excited reflex movements. Such a condition is inherent in the process of development of this stage of life and is offset by the characteristic necessity for long and frequent periods of slumber. The nervous action in the new-born is less controlled by the mechanical influences existing in the

mature nervous system, which in full development give rise to the rigid and stable nervous action seen under normal conditions.

Perversions of function occur through slight causes, as noted, for instance, in the readiness with which the reflex act of vomiting occurs or, under more serious conditions, convulsions are induced. According to Forster, stimulation of the cerebral areas does not evoke localized movements.

Co-ordination is defective in the new-born, reflex movements being explosive in nature. Want of co-ordination is shown also in the movements of the eyeballs.

As to the special senses, the status of nerve function is as follows: The sense of touch, both as to pressure and temperature, is strongly developed, pain slightly; muscular sensations are undoubtedly present, while smell and taste are frequently confounded (McKendrick).

Auditory stimuli are heard from the second day onward, hearing before this time being absent on account of swelling of the subepithelial tissue of the tympanic cavity, thereby limiting the space for the excursion of the ossicles (Uffelmann). The stimulus of light is noted immediately after birth, but a peripheral field of vision does not exist (Cuignet). The eye of the new-born is myopic from undue curvature of the cornea.

As to the psychical development, we may note that the movements are automatic, originating without intention. Imitative and voluntary movements do not belong to the new-born. Cerebration is altogether limited by the infant's instincts and is dependent upon the sense of appetite and physical comfort.

THE STRENGTH AND RELIABILITY OF DRUGS.

By HOBART AMORY HARE, M.D.

[Read November 2, 1898.]

The strength and reliability of drugs do not receive proper attention by physicians, for, as a matter of fact, these important attributes of a drug are lacking for several reasons in many instances. Aside from the fact that the gatherer of crude vegetable drugs may introduce into his bundle enough of another similar plant to enable him to make a profit out of his sales to the wholesaler, who beats him down to the lowest figures, and that this wholesaler also desires to make as much as possible out of his purchase, and, finally, that the retailer wishes to buy as cheap and sell as high as he can, there are other factors even more difficult of control to be contended with. These are that many medicinal plants only contain their greatest activity if gathered at a certain time of growth, or certain parts only contain medicinal powers when in a certain state. Thus, the flower-spikes of the male and impregnated female cannabis indica plant are without medicinal value, whereas those of the unimpregnated plant are valuable. Much of the former could be placed in a bale of the dried drug, and even an expert would not detect it. Again, medicinal plants are like vegetables that we use for food, in this respect, namely, that they grow well or badly according to the soil, moisture, sunlight, and temperature surrounding them, and contain much or little medicinal principle according to whether they are favorably placed. Thus nux vomica beans, apparently perfect in their development, may vary over 50 per cent. in their contents of alkaloid, and so may all of

the important drugs that we employ in pressing cases. That our view of the value of certain drugs is often distorted by such natural variations is an undoubted fact, and not only do our patients and our reputations suffer when a drug fails, but we fail to prescribe that drug in the next case which really needs it, because we are disgusted at its failure when, in reality, our idea as to its need by the patient was correct, but the sample we employed was faulty. A very good instance of this has recently come to my attention. In the early editions of my book on *Therapeutics* I mentioned apocynum cannabinum, and later left it out of the text, because the drug seemed uncertain and of little value. Recently, however, it has become clear to me that I have deprived myself of the use of a good drug for several years when, in reality, the fault lay with the fact that owing to an error apocynum androsæmifolium was often supplied to the druggist by the gatherer of so-called apocynum cannabinum. The latter drug is an efficient diuretic and heart tonic, the former is a violent drastic cathartic, if given freely, and is not an efficient diuretic. It is seen, therefore, that drugs may be dispensed for or by the physician which are not what they are called, which are too strong or too weak, or which are impure or stale, and all these faults may be present without the druggist who dispenses them being consciously careless or dishonest. When to these facts we find that wholesale druggists offer for sale different grades of crude drugs at different prices, and that the retailer may buy the cheapest, if he pleases, it is evident that the physician should exercise some care as to what he prescribes, whether he buys direct from the manufacturer for his own dispensing or has his prescriptions filled by a local pharmacist. But even if the local druggist buys the crude drug at the highest price, to get the best, he has no means of determining the quantity of active ingredient in his purchase, which may be powerless, even if it looks botanically perfect; and, be his processes of manipulation ever so skilful, the product is worthless.

How shall this great element of uncertainty in our treatment of patients be avoided? How long shall we be content to have that which our best judgment dictates seemingly proved faulty by the use of poor drugs instead of poor brains? Recognizing that these

possibilities exist, the Committee of Revision of the last *Pharmacopœia* directed that certain products, as, for example, nux vomica, should have a known content of alkaloid, to be determined by assay; and this much having been done, it is hoped that the next committee will go further, owing to the advances made in chemical analysis during this decade.

There are, however, certain drugs which, because of their complex nature or our faulty technique, cannot be tested satisfactorily by chemical means, and, as ill fortune will have it, nearly all of these are powerful remedies, poisonous in overdose and depended upon in emergencies by every one of us. The chief ones are digitalis, strophanthus, ergot, and cannabis indica. I have already shown, in a paper published in the *Therapeutic Gazette* some months since, that digitalis leaves vary greatly in their medicinal content totally and in respect to each principle; that one set of leaves may contain a large amount of one principle, thereby producing a dominant physiological effect, and another set containing another principle produce still another influence. To quote from my former paper (see *Gazette*, 1897, p. 505): "It will be recalled that digitalis contains at least five principles, of which four are physiologically active and the fifth inactive. From these there may be developed other substances by chemical alterations or decomposition, but they probably are not primarily present. Each of these ingredients possesses a physiological action of its own, and each has a solubility of its own. Of the four active constituents, digitalin, digitoxin, and digitalein act upon the heart muscle, while digitonin has an entirely different effect, namely, the power of depressing the vagus nerves centrically and peripherally and the inhibitory ganglia in the heart. The digitalin here referred to is not the digitalin of amorphous form prepared according to the process of Homolle, nor the crystalline digitalin of Nativelle, neither of which is a pure digitalin, but it is the digitalin of Schmiedeberg.

The effect of Schmiedeberg's digitalin upon the heart is that of a powerful stimulant, for under its influence the individual heart-beats become more powerful (four to six times greater than normal), and it simultaneously causes a rise of blood-pressure, first by in-

creasing the strength of the heart, and second by stimulating the centric and peripheral vasomotor apparatus.

The physiological effects of digitalein and digitoxin are identical with those of digitalin, except that they do not stimulate the vasomotor centre nor the pneumogastric apparatus, and so do not directly raise blood-pressure or slow the heart. In other words, they increase the force of ventricular contraction. The effect of digitonin being to depress the vagus nerves, it will be seen at once that it antagonizes the vagal effect of the digitalin on these fibres, and so prevents digitalis from slowing the heart to the extent that would result from the use of digitalin alone. It also depresses the heart muscle. The proportion of digitonin in digitalis varies, but it is not present in sufficient amount entirely to overcome the inhibitory influence of the digitalin.

If we now turn to a consideration of the solubilities of these principles we can readily explain the different effects produced by the infusion and tincture or fluid extract. Digitonin is soluble in water, as is digitalein, but digitalin is only slightly soluble, and digitoxin is scarcely soluble in water at all. As a result, the use of the infusion in a case of heart disease would not give the patient the same degree of cardiac power as the use of the tincture, for not only would the most powerful stimulant of all to the heart, vasomotor system, and vagi be present in small amount, but, in addition, the large proportion of digitonin would antidote it.

On the other hand, digitonin is sparingly soluble in alcohol, while digitalin and digitalein are readily soluble in it, digitoxin being slightly so. It would seem, therefore, that in the presence of a failing heart and circulation the tincture and the fluid extract are the preparations greatly to be preferred to the infusion, because they contain large amounts of the active stimulant ingredients.

The reason that the infusion acts efficiently in some cases as a diuretic probably depends upon the fact that as it does not contain so much digitalin it is less apt to cause spasm of the renal vessels; but if the heart is feeble and there is renal stasis, the tincture is probably the better preparation to overcome this state, because it both aids the heart and, by contracting the renal vessels, overcomes the stasis. The use of digitalin is inadvisable unless

we are sure that we get that made according to the process of Schmiedeberg, for the other digitalins usually sold are very uncertain. The infusion is far more apt to disorder the stomach than the fluid extract or tincture, because of the irritating digitonin.

A very different physiological effect, therefore, will follow the use of one sample of digitalis than of another, even if both be tinctures, and if we vary the pharmacopœial product an infusion will give other results than a tincture. It is better, therefore, to use the same product in every case when we wish to maintain an effect, and better to use a product the activity of which has been tested chemically, or physiologically when chemistry fails us, as it does in this case, for digitalis cannot be satisfactorily assayed. That is, we should use a preparation in which its principles are so balanced that it is capable of producing a normal physiological effect. Such a physiologically tested product is now marketed, and, even if the crude drug vary greatly, by this means the physician finds in his hands a fluid extract of digitalis which has the same physiological action when he buys it in 1899 as did the sample he bought in 1897. So with strophanthus. Houghton has recently pointed out that a physiological test is essential to determine its real value, and that without such tests one pharmaceutical product may contain much more strophanthin than another, and that as strophanthin is twelve times as poisonous as absolute hydrocyanic acid, such variations are to be avoided. Again, ergot varies in its crude state from a worthless product to a powerful one, and in such instance may be apparently perfect. It is a drug which cannot be chemically assayed within practical lines, and therefore must be tested physiologically. Curiously enough, it has been found that if it be active it will cause the comb of a rooster to become gangrenous by cutting off the vascular supply, while if the ergot be valueless it will fail to have any effect. A paper illustrating this has been recently published by Houghton, and I show you an oil-color sketch showing the changes named. Recently 20,000 pounds of crude ergot were offered for sale in this country, but when samples of it were tested they proved useless, and were therefore refused; but, without doubt, this 20,000 pounds were not thrown away by the wholesaler who had it on his hands, and the

finished product prepared from this useless stuff is now being swallowed by the post-partum female or other hemorrhagic patient without any effect.

This matter is of such importance that I have brought it before the College if for no other purpose than to show that we should not only take care what we prescribe, but also see to it that only physiologically active and equally strong preparations are dispensed.

THE ABUSE OF ERGOT IN THE TREATMENT OF HEMORRHAGE.

By FREDERICK A. PACKARD, M.D.

[Read November 2, 1898.]

It is now quite a long time since the writer was impressed with the fact that ergot might be not only of no value, but positively harmful, in the treatment of hemorrhage. This view has been strengthened partly by the good results achieved in treating hemorrhage by remedies acting in a manner diametrically opposite to that of ergot, partly by seeing the steadily increasing number of writers who are urging the use of remedies other than ergot in hæmoptysis.

My first doubt as to the value of ergot in hemorrhage occurred when I looked back upon my treatment of a case of traumatic internal hemorrhage to whom I had given ergot upon his admission to the University Hospital, in which institution I was at that time resident surgeon. On thinking over my treatment of the case after his death, I hoped that I had done him no harm by giving ergot, but I became convinced, after but little thought, that I could not possibly have done him any good. And yet I was acting as I thought for the best when I ran over in my mind the various hæmostatics and concluded that ergot would do the most good.

Since then this question of the use of ergot in any (non-uterine) hemorrhage has been frequently present in my mind, and I am convinced that I have acted for the best in refraining from the use of the drug.

Other cases have been seen by me which have convinced me that ergot was frequently administered with as little hope of good result

and as much capacity for harm as was the case in the patient mentioned above with a rupture of some visceral arterial trunk.

One of these cases was in the person of a large, florid man seized in the street with vertigo, difficulty in speech, and some impairment of power in the right arm. He had been helped into a drug-store, where he was given by the combined druggist and physician a hypodermic injection of some ergot preparation. He almost immediately became unconscious, had complete right hemiplegia, and died but a short time after being brought to the hospital. Doubtless the druggist went through somewhat the same train of thought as myself in the case at the University Hospital: hemorrhage occurring, a hæmostatic is needed; tannic or gallic acid or acetate of lead cannot reach it; ergot is the best drug to use, as it narrows the calibre of the arteries. This may have been an example of ingravescent apoplexy from the very onset, but the history pointed to a slight and gradual hemorrhage until the administration of ergot, when the whole picture changed.

I was asked to see in consultation a man with phthisis showing marked hemorrhagic tendency. He had had a profuse hæmoptysis a week before I saw him, and had been constantly spitting up fresh blood in small quantities ever since, in spite of the steady use of moderate doses of ergot administered at rather frequent intervals. I advised the discontinuance of ergot and the administration of concentrated food without any medicine. The hemorrhage then ceased promptly, and, for quite a number of weeks, to my knowledge, had not returned. Of course, the hemorrhage might have stopped at the same time without any change in treatment, yet the coincidence, if such it were, was quite striking and suggestive.

In going through the wards of a hospital with one of my friends, the visiting physician, we came to the bed of a man who had just been brought into the ward. He had been coughing up small quantities of blood for some days and had with him a half-emptied bottle of ergotin which he had been taking because of a former severe hemorrhage, many slight bleedings, and the advice of a physician to have ergot always on hand in case of a repetition. He showed very distinct evidence of loss of blood, and the physi-

cian ordered an immediate hypodermic injection of a large dose of ergotin. This was the last patient seen in the ward, yet before we had left the hospital doors the resident physician was summoned to the new patient, who was having a severe hemorrhage from the lungs. I later heard that the patient never rallied, but died within twenty-four hours from exhaustion. In this case ergot certainly failed to control the hemorrhage.

During the summer I saw an elderly lady with chronic interstitial nephritis, left ventricular hypertrophy, and high arterial tension. She had had several alarmingly protracted attacks of nose-bleeding, and was at that time taking a nightly dose of ergot as a preventive of further attacks. I know nothing as to the medicinal treatment of her former nose-bleedings, but do not wonder at their severity if ergot was the hæmostatic selected for internal administration. Epistaxis in such cases results, doubtless, partly from disease of the bloodvessel walls, but chiefly from the extreme tension existing within these vessels. This tension ergot would surely tend to increase.

Medical hemorrhage occurs from capillary oozing or from rupture of a bloodvessel. The capillary oozing occurs in those with too great a bulk of blood within the general or local vascular system, in those with certain poorly-understood changes in the blood (scurvy, hæmophilia and the various anæmias), or in those with diseased bloodvessels. Hemorrhage from rupture (barring external trauma) occurs from degeneration, erosion, atheroma, or calcification, with or without aneurismal dilatation of the bloodvessel walls.

Except in cases of bleeding resulting from the condition of the blood, hemorrhage is arrested, either naturally or by the aid of drugs, through the formation of a clot which plugs the rent. The formation of such a clot is favored by a sluggish stream, retarded by a rapid, forcible flow. Cohnheim thus puts it: "When a defect, or gap, is produced at any point in the vascular system, all resistance ceases there, and the blood will, in consequence, flow toward it and escape through the aperture with an energy which naturally is greater the higher the pressure prevailing in the part of the vascular system involved." A clot, once formed, maintains

its position as a plug in the orifice just so long as its adhesion to the orifice of the opening is sufficient to resist the pressure of blood within the bloodvessel.

Ergot acts as a vasoconstrictor by its centric action upon the vasomotor centres, vessels under observation being seen to contract after its administration. This action is present in both the systemic and the pulmonary circulation (James Andrew, Bradford, Dean, Bokenham). If its action could be directed against the vessel or system of vessels actually concerned in the hemorrhage, it is conceivable that the drug might do some good, although even in that case it is difficult to see in what way contraction of the muscle fibres in the neighborhood of a vascular rent could fail to draw apart the divided edges. Such local selective action upon a part of the vascular system might conceivably produce ischæmia of the part, but its occurrence is not claimed or proved. Again, it is reasonable to presume that the vasoconstrictor action of ergot would be decidedly less effective where the vessel wall was diseased than in places where it was healthy, so that any local vasomotor effect would be far more than counterbalanced by the general vessel constriction with its consequent rise of blood-pressure. The administration of a dose of ergot causes a rise of pressure in the general and pulmonary circulation. Presumably, therefore, there would be greater tendency for a clot to be swept from the point of rupture. If the mass of blood were previously large enough to seek escape through the rent in a vessel, diminution in the capacity of the vascular system from constriction of the arterioles would tend to increase such escape, the only alternative to this conclusion being that the portal circulation received the relatively excessive bulk of blood—a more purely theoretical supposition.

The attempt to check hemorrhage by a means that diminished the capacity of the bloodvessels of the body would seem to be exactly the reverse of what we should aim at.

Even with hemorrhage on the venous side of the capillaries the same reasoning would apply, as it is not proved that arterial constriction causes a fall in venous pressure. It is also to be considered that, in comparison with arterial hemorrhage, bleeding from the venous side of the circulation is rare.

No one could entertain the idea of controlling hemorrhage from a ruptured aortic aneurism by the use of ergot. To go from large to small things, why should we hope for benefit from its use in the case of smaller diseased vessels, or why should we use ergot to check leakage from the overfull vessels of chronic interstitial nephritis?

In hemorrhage from the bowel (as in typhoid fever), the blood escapes not from dilated, but from eroded bloodvessels. What good can be accomplished by diminishing the total vascular area? Even if we could produce diminution in the calibre of the ruptured vessel by the use of ergot, we should bear in mind that at the same time we are increasing the peripheral resistance offered to an already handicapped heart. In hemorrhoidal bleeding, in cases of rupture of œsophageal varices, and other forms of medical hemorrhage, it is, to my mind, equally useless to contract the arterioles.

In opposition to the views that I am endeavoring to present, it has frequently been said to me that experience has proved the value of ergot in hemorrhage. This I would grant in the case of post-partum hemorrhage, but I am skeptical as to any other form. In this skepticism I find myself supported by an increasing number of authorities who decry its use in hæmoptysis. I would urge its being abandoned in other forms of medical hemorrhage as well. In post-partum hemorrhage it doubtless is of value—as is also the Credé method—but probably more from its power of contracting the womb than by its action on the bloodvessels. It is to be remembered that in the case of medical hemorrhage, our old friend, "post hoc ergo propter hoc," must be considered, and that with the administration of ergot or any other drug we always combine valuable measures for the relief of pressure, such as recumbent rest, relief of mental agitation, etc., which may of themselves cause sufficient diminution in pressure to more than counterbalance the physiological action of ergot.

Finally, I would sum up the views expressed above as follows: In treating medical hemorrhage our object should be to endeavor to favor the formation of a clot in the ruptured vessel by measures that increase the coagulability of the blood, by calcium chloride,

or, where possible, by local applications (such as the topical use of such remedies as hamamelis in epistaxis, the gentle inhalation of turpentine or other hæmostatic vapor in hæmoptysis, the administration of tannic acid in hæmatemesis, of acetate of lead in hemorrhage from the bowel), to prevent mechanical disturbance of the clot by producing local rest (opium to check cough and to stop peristalsis), and to use our best efforts to lessen blood-pressure (as by restriction of fluid ingestion, by the use of saline laxatives where permissible, by the hot foot-bath, by ligature of the extremities, by veratrum viride, nitroglycerin, or venesection in various classes of cases), but, above all, to avoid any cause for increase in blood-tension, and especially to abstain from the use of ergot, which is, above all other drugs, the most active in lessening the capacity of the arterial tree.

DISCUSSION.

Dr. Edward W. Watson: I did not come in early enough to hear the beginning of Dr. Packard's paper; in fact, I heard only the latter part of it, but I was at once struck with the fact that it coincided with the experience I am getting nearer to the longer I live. The use of ergot in pulmonary hemorrhage has often seemed disastrous. I have never seen the slightest benefit, and I have strongly suspected the opposite, so that for years I have given it up. When hemorrhage results from an eroded vessel, it seems to me that ergot is contraindicated: it cannot possibly do any good. But whenever hemorrhage results from small ruptured arterioles it is of value. Where hemorrhage can be treated locally ergot has a definite effect. In epistaxis, in 1867, in the first year of my practice, I commenced using it, and I have never seen any need for substituting anything else for ergot, giving it in large doses and using it locally in the nasal cavity. The local use in certain other forms of hemorrhage is effectual, but in regard to the bleeding of hæmatemesis I think it is purely a question whether or not ergot acts upon the muscular fibre in such a way as to make the ulcerated surface worse. I cannot see how Dr. Packard could suggest the use of hamamelis and ignore the use of ergot entirely. Some of the uses of hamamelis correspond to those of ergot, especially its local application.

Dr. H. A. Hare: One or two points which Dr. Packard mentioned struck on my ear as perhaps being worthy of note. I think Dr. Packard made rather a mistake in comparing rupture of a large bloodvessel like the

aorta, or any other large artery, to a hemorrhage from a small artery, which I thought ought to be combated by the use of ergot. I think any one who knows about the histology of the vascular system knows that the muscular fibre is developed more and more as the arteries become smaller and smaller. In the aorta we have practically no muscular fibre. If by any reason the vasomotor system loses control of these well-developed muscular fibres in the arterioles, we have a condition of very greatly lowered arterial pressure, because the blood escapes into the enormous area of capillary circulation without impediment, and it is a well-known fact among physiologists that the capacity of the capillary circulation is twenty or thirty times more than that of the arterial system. Upon this system the ergot acts either by the influence it exercises upon the nervous mechanism or by direct action upon these unstriped muscular fibres themselves, and, therefore, in any case of distinctly oozing capillary hemorrhage, as has just been said by Dr. Watson, ergot is distinctly indicated, for it will contract the muscular fibres of the arterioles and decrease the capacity of the capillary network which is leaking. If, on the other hand, hemorrhage comes from a good-sized artery which has been ruptured or cut, I think it is bad therapeutics to administer ergot, because, as Dr. Packard says, it does raise arterial pressure and puts obstruction in front of the blood instead of behind. In capillary hemorrhage the blood comes this side of where the hemorrhage has taken place. I took the opposite view in a paper on this subject which I read as the Address in Medicine before the American Medical Association in 1893, that the use of ergot was futile in pulmonary hemorrhage. I think it is futile for the reason given. The pulmonary vessels have very few or no muscular fibres, and, therefore, ergot cannot arrest bleeding by contracting the vessel-walls.

I must also take issue with Dr. Packard in the statement he makes concerning the selective action of drugs, that areas are affected less by drugs when diseased than when in health. I do not think this is the teaching of therapeutics, or physiological action, or pharmacology, to-day. I think it is one of the fortunate things in medicine that, as a rule, unless an organ is completely diseased drugs will exercise a dominant influence on that part. That is to say, if you have an area in the body in which the capillary network is hyperæmic and the arterioles supplying that area are relaxed, therefore allowing it to become hyperæmic, if you give doses of ergot you will have a great contraction taking place. On this basis many persons employ ergot in congestion of the brain with the idea that it may have a useful influence. In many of these cases it seems to exercise some beneficial influence; whether by this means or by some other, we cannot speak positively.

Finally, a word in regard to a substance Dr. Packard overlooked when he mentioned the things useful in controlling hemorrhage. I do not know why the combination has received so little attention from the profession.

It is a combination of tannic acid and antipyrine and was first suggested for this purpose by Dr. Roswell Park, of Buffalo. It makes a gelatinous mass which is exceedingly efficacious in controlling hemorrhage which does not arise from a large vessel. Tannic acid and antipyrine combined form a very efficient hæmostatic.

Dr. F. A. Packard: Personally I do not feel able to positively assert that in case of pulmonary hemorrhage it comes from rupture of the arterioles; from rupture of an aneurism in the wall or from capillary oozing. In most cases of pulmonary hemorrhage it is from a minute aneurism in the wall of a cavity. Certainly in large numbers of gastric ulcers the hemorrhage comes from a visible arteriole. So, also, in gastric cancer, while a great many hemorrhages come from capillary vessels, undoubtedly many come from erosion of a large bloodvessel. It seems to me it is an extremely difficult thing, unless we can see the part, to say whether the hemorrhage is capillary or arterial. As to the pulmonary vasomotor supply, my authority for speaking of the action of this mechanism is the elaborate experiments of Andrew, Dean, and Bokenham, which have certainly seemed to show the existence of such a vasomotor system.

Dr. Hare rather misunderstood my contention in regard to diseased vessels contracting less than others. I did not refer to the condition of overfulness of bloodvessels whose walls were intact. It seems to me that in that case the question is very different. I consider that ergot can produce contraction of the arteriolar area, and hence a relative increase in the volume of blood in the whole vascular system, and it is by this means that hemorrhage may be actually increased. I do not think any one can look at a large eroded vessel in the wall of a pulmonary cavity, or the miliary aneurisms of the small cerebral arteries which are infiltrated with round cells, or are the seat of fatty degeneration, or are infiltrated with calcareous salts, and think of their having any muscular contractility left whatever.

FRACTURES OF THE INTERNAL CONDYLE OF THE HUMERUS AND THE CORRECTION OF THE RESULTANT DEFORMITY BY OPERATIVE MEASURES.

By GWILYM G. DAVIS, M.D.

[Read October 5, 1898.]

Fractures of the internal condyle of the humerus may conveniently be classified as being of two kinds, one intracapsular, involving the trochlear surface, and the other extracapsular, detaching the so-called epicondyle and not involving the joint. In young people this may be simply a separation of the epiphysis. The nomenclature and classification of fractures of the lower end of the humerus vary so much with different writers as to cause considerable confusion as to what is actually meant. In order to make the subject clear, it may be said that there are four centres of ossification to the lower end of the humerus: one for the trochlea, one for the capitellum, and one for each of the condyles. It has become customary, however, for surgeons to speak of fractures involving the trochlea or capitellum as fractures of the internal or external condyle. In order to distinguish fractures which separate the condyles alone, we may designate them as extracapsular, while those which go farther in and pass through the joint surfaces may be called intracapsular fractures either of the external or internal condyle, as the case may be.

Chaussier designated the true condyles as epitrochlea for the internal condyle, and epicondyle for the external condyle. Other authors have given the name epicondyle indiscriminately to the internal and external condyles; thus, Henle speaks of the epicon-

dylus medialis and epicondylus lateralis. The designation of intra- and extracapsular fractures, and the avoidance of the word epicondyle entirely, will prevent all ambiguity and doubt as to what is meant.

The experiences and views of different surgeons as regards these injuries vary greatly. Sir Astley Cooper regarded fractures of the internal condyle as being frequent, while Malgaigne regarded them as being extremely rare, saying he never had seen them (*Fractures and Dislocations*, Philadelphia, 1859, p. 451). As to my own experience, extracapsular fracture of the external condyle I have never encountered; if it ever exists, it must be so rare as to be practically unknown. Fractures involving the capitellum are not particularly rare, but are comparatively heterodox in their character. They do not seem to possess the same clean-cut characteristics of the fractures involving the internal condyle. There is liable to be more than one fragment, and even the head of the radius may be involved. The disability which they occasion is most apt to be a limiting of flexion and extension, and less frequently also of pronation and supination. It is comparatively rare that they produce an axial angular deformity, owing to pushing upward of the displaced fragment. Fractures of the internal condyle have been, in my experience, the most common of the fractures of the elbow. Extracapsular fracture of the internal condyle has been seldom met with, perhaps not more than twice. In these the lesion was well marked and the diagnosis perfectly clear. Intracapsular fractures of the internal condyle have been frequent. While they sometimes cause restriction of flexion and extension, they not infrequently show a tendency to lateral deviation of the forearm, owing to the fragment being displaced upward, thereby causing the line of the joint to incline inward instead of—as it does normally—outward. This deformity is typical of the lesion, and follows with a fair amount of frequency these injuries. Who first described it, I do not know; but it is to American surgeons principally, and particularly those of our own city, that the profession owes the bulk of our knowledge concerning this peculiar deformity. John Syng Dorsey, in his *Elements of Surgery*, vol. i., published in Philadelphia in 1813, gives a most

excellent illustration of it, and characterizes it as an "angular projection of the elbow outward."

FIG. 1.

Normal humerus. Mütter Museum of the College of Physicians of Philadelphia.

It was the able, clear, and forcible writings of Dr. Oscar H. Allis, however, that caused the deformity to be known, recog-

FIG. 2.

Anterior view of a right humerus, with displacement of the internal condyle upward from fracture. Mütter Museum of the College of Physicians of Philadelphia.

nized, and intelligently treated. His articles in the *Medical and Surgical Reporter*, July 1, 1876; the *Philadelphia Medical*

Times, August 2, 1879; the *Annals of the Anatomical and Surgical Society of Brooklyn* (now *Annals of Surgery*), vol. ii., Au-

Fig. 3.

Posterior view of Fig. 2.

gust, 1880, and the *Transactions of the Medical Society of Pennsylvania*, vol. xiii., 1881, left comparatively little to be added to

Fig. 4.

Deformity in Case I.

the subject. Later, Mr. Munn (*Clinical Society Transactions*, 1892) also wrote about it.

The bony lesion, which is the cause of the deformity, will be readily appreciated by comparing Fig. 1, of a normal humerus, with Figs. 2 and 3. These show the internal condyle fractured and displaced upward, thus causing the joint surface to face outward instead of being nearly transverse, as seen in Fig. 1. The

FIG. 5.

Result of operation in Case I.

clinical appearance of the deformity is shown in Figs. 4, 6, and 7. In Fig. 4 both arms of the same patient are shown; the sound arm has an outward angle of 173 degrees, while the deformed elbow has an inward angle of 160 degrees, thus making a departure of 27 degrees from the normal line. As evidence of the

FIG. 6.

Deformity in Case II.

frequency of this deformity, I have photographs of five cases, and have seen others besides those cases of recent fracture in which the tendency to the production of this deformity was counteracted by treatment. In this country the name gunstock deformity has

been almost universally used to describe the affection. It was, I believe, so named by Dr. Allis. Abroad it is called cubitus varus, and this latter name is advocated by Dr. H. Rieffel in a very able article entitled "Étude sur le Cubitus varus et le

FIG. 7.

Deformity in Case III.

Cubitus valgus," in the *Revue de Orthopédie*, July and November, 1897.

As regards the cause, it is usually due to a failure of the surgeon to recognize and prevent the displacement of the fragment during

FIG. 8.

Result of operation in Case III.

the first few weeks of the treatment of the fracture. The use of right-angled splints is particularly conducive to overlooking the deformity, because it is only visible when the arm is in an extended position. If it is particularly desired to use right-angled splints, the arm should be extended at each change of the dressing

or sufficiently frequently to assure one's self that no deformity is occurring. To guard against it Allis advised the treatment of these fractures in an extended position. In this he is supported by Rieffel and others. Personally, I have found that the completely extended position is so inconvenient and unsuitable for walking patients that I have employed an obtuse angular splint, as shown in Fig. 9. The tendency to angular deformity is overcome by placing a pad over the external condyle and using an additional external lateral splint, these being fastened on by broad bands of adhesive plaster which prevent the splint from rotating; the elbow is pushed inward toward the ulnar side, while the bones of the forearm and arm are drawn outward, and so the tendency to

FIG. 9.

Fracture of internal condyle, with tendency to gunstock deformity, treated with an anterior obtuse angular and external lateral splints.

deformity is counteracted. This external lateral splint and pad should be used for fully five weeks and carefully examined twice weekly. The use of the straight splint even is not always efficacious, as is shown by two of the three cases here detailed having been treated by that means.

In my experience the union of the fragment to the shaft is slow in taking place; therefore it is not desirable to assume that deformity will not occur if we are careful to maintain a correct position for only two weeks; the position of the fragment is certainly capable of being modified for a much longer period of time. It is wise to remember that Allis insists that the use of a right-angled splint, with the resultant pressure from the bandage, directly favors the production of the deformity.

It is a peculiar fact that in these cases flexion and extension are

usually unimpaired. One reason of this is that they commonly occur in children, and the surgeon, when consulted for the deformity, sees the case a long time after the original injury. It is customary not to treat the deformity after firm union has taken place. In our text-books no remedial measures are advised. The reason given is that the disability is not sufficient either for æsthetic or utilitarian purposes. In boys the question of appearance does not count for much, but in girls it certainly should have some weight. It is certainly a deformity, and, as such, is not desirable.

As regards use, it is by no means certain that no disability is experienced. It seems almost self-evident that there must be many instances in which the deformed arm could not perform certain acts so well as if it were straight. The departure from the normal line is so marked that even the length of the arm, as compared with its fellow, is considerably shortened; the patient cannot reach so far with it as with the uninjured one. Attention has often been called to the impairment of the carrying function. If we were able to follow the patient in the performance of the various acts of life I feel sure we would find on many occasions his use of the member to be more or less seriously limited, even though he himself might not be aware that such was the case. A myope only appreciates his disability after normal vision has been revealed to him by a concave glass. As the deformity can be much improved by a comparatively safe operation, I would urge that it be done in suitable cases. An osteotomy, even in the hands of the less skilful, is not apt to be followed by serious results. As the joint is not involved in the operation, limitation in the movements of the elbow is not liable to occur. I have operated three times for the correction of this deformity, twice in October, 1896, and again recently. The cases are as follows:

Case I.—A girl, aged eleven years. Six years previously she fell from a step and landed on her arms, sustaining a fracture of the internal condyle. It was treated on a straight splint for six weeks. The resultant deformity, with the sound arm for comparison, is shown in Fig. 4. The result of the osteotomy for correction is seen in Fig. 5, taken from a photograph.

Case II. was a boy, aged six years, who, two years previously, had sustained a fracture of the internal condyle from a fall. The angle formed by the deformity was about 155 degrees, at least 30 degrees from the normal direction. The illustration is from a photograph. The result of the operation was perfectly satisfactory, but he left the hospital before I secured a photograph of the arm in its corrected position.

Case III. was that of a boy, aged eight years. His internal condyle had been fractured by a fall two years before the time of applying for treatment. His physician treated him with an almost straight splint at first, and then with a right-angled one. He stated that it was almost impossible to keep a splint on the boy, who was an exceptionally bad one. This case is shown in Fig. 7. The angle of deviation is exactly 39 degrees from the line of the humerus. Fig. 8 shows the result of operative correction.

The illustrations in these cases are taken direct from photographs. The fact that two of them were unsuccessfully treated, at least in part, with a straight splint is significant. The reason lies, as stated by the physician of the last case, in the difficulty of keeping it properly applied. It is for this reason that it is advisable to fasten the splint firmly to the arm by broad bands of adhesive plaster. This will prevent the splint from rotating around the arm, and is an absolute necessity in the use of splints. If desired, a roller bandage can be applied over the splint. All three of the cases had almost normal flexion and extension and rotation. This was likewise the case six to eight weeks after the performance of the operation. In two of the cases the electric drill was used to divide the bone; in the third a narrow osteotome was used. The section was made on the inside, so that the external fibres and periosteum were not disturbed, but remained intact, and thereby prevented displacement of the fragment. If the external side is divided by the osteotome the internal side is fractured in straightening, and therefore the bone is detached in almost its entire circumference, a very undesirable thing. The technique is as follows: An incision is made, two and a half centimetres (one inch) long, beginning a centimetre above the tip of the internal condyle and extending upward. This is deepened by blunt dissection until the bone is reached. The brachial artery and median nerve lie to the outer side, and the ulnar nerve to the inner or posterior side of the incision. The edges of the wound being held

apart by two blunt hooks, a narrow osteotome is inserted and the bone divided to the extent desired, but not entirely across. The remaining portion of bone is then fractured or bent sufficiently to bring the arm into the desired position. A single catgut suture serves to hold the lips of the wound sufficiently together, and an aseptic dressing is applied. The arm, in an extended position, is then enveloped in a plaster-of-Paris bandage from the fingers to the axilla, care being taken to hold it in its corrected position until the plaster is well set; too much padding must not be used. If desired, the dressing can be opened at the end of two weeks, and, being assured that everything is progressing favorably, reapplied and allowed to remain six weeks from the date of operation. On its removal, massage and passive motion will restore the mobility to the joint in a couple of weeks.

So far as I know, Tilanus (*Deutsche Zeitschrift für Orthopädische Chirurgie*, 1891, vol. ii. p. 296) is the only one who has performed osteotomy for the correction of this deformity. He divided the bone on its external side, and had following a temporary paralysis of the musculo-spiral nerve. This is another reason for preferring internal division as herein advocated. The performance of osteotomy in these cases has recently been suggested as a proper mode of treatment for the relief of disability or deformity by Dr. John B. Roberts, in the last issue of the *Philadelphia Medical Journal*, September 24, 1898, p. 617.

As to whether the treatment in acute flexion of fractures in which the tendency to this deformity exists will prevent its occurrence, and give as good results as it appears to have done in other cases, remains to be demonstrated. The use of pins to hold the fragment in place, as suggested by Stanley Boyd (*System of Surgery*, Treves, vol. i. p. 822), and advocated by John B. Roberts, may be advisable in some cases, but in my own cases a good result has been obtained by the splint dressing already described.

Gunstock deformity not only occurs from fracture, but it may be caused by rickets. Fig. 10 shows such a case. It is of a child, aged three and a half years. It had marked anterior curvature of both tibiæ, for which wedge-shaped resections were done. The

angle formed by the right elbow was 165 degrees, while that of the left was somewhat less. I had thought of the possible advis-

FIG. 10.

Gunstock deformity caused by rickets.

ability of operating on this case if the deformity persisted, but recently the child died at its home, of diphtheria.

DISCUSSION.

DR. JOHN B. ROBERTS: The operation done by Dr. Davis is reasonable, and is based on the same general principle as the Macewen method of osteotomy for the correction of knock-knee. I have never done osteotomy for the correction of malunion of condyloid fractures of the humerus, though I advised it in two cases in one family some four years ago. The parents of the two children with the deformed fracture did not consent. My first definite proposition that this method be adopted was at the meeting of the American Surgical Association in 1892. I have frequently advocated it since that time.

I nearly always treat condyloid fracture in the extended posture with the object of maintaining the normal angle between the axes of the arm and forearm. The splint employed is usually a thin piece of wood, cut with the penknife to correspond with the axes of the arm and forearm, about one and one-half inches wide and twelve inches long. This is applied to the flexor surface of the limb with a little padding of cotton in the bend

of the elbow, so that the joint may not be kept *fully* extended. Full extension is irksome, but almost complete extension is comfortable and gives the surgeon opportunity to see that the "carrying" angle of the arm is maintained. Sometimes a gypsum splint or dressing is used to maintain the extended posture of the joint. Very occasionally, when there is great swelling, the fracture is treated with the elbow flexed for a few days; but extension is soon substituted.

FIG. 11.

Experimental fracture of internal condyle (made with osteotome). Fragments kept in position with wire nail driven through skin. Skiagraph taken with dorsum on photographic plate.

Dr. Davis keeps splints on his fractures longer than seems necessary; three or four weeks are sufficient in average cases.

Displacement of fragments in some of these condyloid fractures may be judiciously prevented by subcutaneous nailing, as suggested in my recent

FIG. 12.

Experimental V-shaped fracture of condyle (made with osteotome). Fragments fixed with wire nail driven through skin. Skiagraph taken with anterior surface on photographic plate.

paper before the British Medical Association.[1] Stimson, of New York, treated some years ago an open fracture in this way.[2] Whether it has been heretofore advocated in closed fractures I do not know. Experimental observation on the cadaver has convinced me of its worth.

FIG. 13.

Experimental T-shaped fracture of condyles (made with osteotome). Fragments fixed with three "fracture-nails" driven through skin. Skiagraph taken with anterior surface on photographic plate.

Special fracture-nails are made for the purpose; but ordinary wire nails will answer, if long enough and sufficiently well tempered. A few blows

[1] Philadelphia Medical Journal, September 24, 1898.
[2] Transactions American Surgical Association, 1891, ix. p. 272.

with the hammer will drive them into the bone so as to keep the reduced fragments in place.

Exploratory incision should undoubtedly be adopted in a certain proportion of condyloid fractures, so that the character of the fracture-lines may be known and the fragments be properly readjusted. Etherization and the use of the Röntgen ray will make this unnecessary in the great majority of cases.

The treatment of condyloid fractures by acute flexion has been advocated by Dulles, Smith, Jones, and others, but I have had no experience with the method, being well satisfied with my ability to preserve the "carrying function" by treatment in the extended posture.

Dr. Wm. J. Taylor: I have had quite considerable experience in treating these fractures with the method of forced supination and forced flexion. According to the investigations of Smith, of Boston, who made a series of experiments upon the cadaver, this is the position in which the fragments are in their best apposition, and it is practically impossible to get that position of the arm of complete supination with forced flexion if the fragments are much displaced. I have used this method in quite a number of cases in children and adults, and with most excellent results. The good results I have had with this method I have never seen equalled by any other form of treatment, but I have had one case where results were not good. Here the destruction was very great, and I did not see the patient for some days after the accident occurred; it was in a hospital, and I took the diagnosis of another surgeon. The flexion was present, but I do not think there had been complete reduction of fragments. Some time after I had a skiagraph made of the elbow, and I found the cause of trouble to be a slight displacement of a fragment of bone. I propose shortly, if the results are not improved by massage, to cut down upon the joint and remove the obstruction. I am very well pleased with this method and propose to use it extensively. I have treated many of these cases in the extended position, and the results are all that Dr. Davis claims for it.

Dr. Cleemann: Since I became acquainted with Dr. Allis' paper I have treated all the cases that came under my care in the extended position. There is no gunstock deformity. I have asked a patient to come to-night whom I have treated for a marked fracture of internal condyle in which the result seems to be perfect. It is a child, and you will observe there is only a little callus or projection of the lower fragment in front of the joint. That does not materially affect the flexion, and the two arms are to all appearances exactly similar.

There is some callus or projection of the lower fragment in this child I present, but no deformity of the gunstock sort. This patient was first taken to the Children's Hospital, and Dr. Ashhurst saw the case there and dressed it, with the prognosis so serious that the people got frightened and, with a prejudice against hospitals, asked me to take charge of the

case. It was in the flexed position when I first saw it. In putting on a straight splint the child suffered no particular inconvenience.

Dr. John B. Shober: I desire to ask Dr. Davis whether it is not true that, as a result of the treatment he advocates for these cases, a certain degree of lengthening does not obtain. He does not mention this point in his paper, and it seems to me that it is an important one.

I have made a habit for many years of always fixing my splints, wherever used, with a few strips of adhesive plaster before applying the roller bandage. I am glad to see that Dr. Davis has drawn attention to the importance of this precaution.

Dr. Davis: In regard to what Dr. Shober has said as to the lengthening of the arm, it does do so somewhat. As regards the character of the splint, the one I use is an anterior angular splint with very obtuse angles, with an additional short external splint. I do not think it necessary to go into a discussion of all the best methods of treating fractures of the elbow-joint, but my experience of treating fractures has been that a large number of fractures of the elbow-joint will not be followed by any marked disturbing symptoms; it is only on rare occasions that a fracture will come along which refuses to pursue a favorable course in spite of everything that is done.

As to the value of the Jones method, it ought to be tried in this class of cases before one can determine anything in regard to its efficacy. The tendency only occurs in a comparatively small proportion of fractures of the internal condyle, and, as far as I know, nobody has reported even a single case of a fracture with marked tendency to gunstock deformity treated in a flexed position, although good results have been ascribed to it in fractures of the elbow in general.

APPENDIX.

ABSTRACT OF THE REPORT OF THE LIBRARY COMMITTEE.

The Library contains 55,654 volumes, exclusive of duplicates, 1557 more than reported last year; also 37,367 unbound pamphlets, reports, and transactions; 230 medical serials, including journals, transactions, and reports. are regularly received by purchase and exchange, and more than 400 current numbers of medical, pharmaceutical, and dental journals have been presented. A large number of duplicates have been sold or exchanged, and 921 remain on hand.

Thirty-one of the new publications added to the Library were written or edited by Fellows of the College.

Seventeen autograph letters of Jenner, numerous signatures of distinguished physicians, and some photographs of medical interest have been presented.

There have been 4517 visitors to the Library; 2111 books have been taken out, and 8647 have been furnished for consultation by the Assistant Librarian, in addition to a large number taken directly from the shelves.

George C. Harlan,
Chairman.

LIST OF PAPERS: SECTION ON OPHTHALMOLOGY.

December 22, 1897.

Exophthalmos Due to Growth in the Orbit. Two Cases of Traumatism of the Orbit, by Dr. G. C. Harlan.

A Case of Probable Remnants of the Sheath of the Hyaloid Artery, by Dr. William Zentmayer.

A Case of Transient Opacity of the Lens from Traumatism. A Case of Secondary Centre of Fixation for Distance in Divergent Strabismus from Over-correction of Convergence, Binocular Vision for Near with Muscular Asthenopia, by Dr. B. A. Randall.

Removal of the Lens in High Myopia, with a Case, by Dr. Edward Jackson.

January 18, 1898.

A Case of Chancre of the Ocular Conjunctiva, by Dr. G. E. de Schweinitz.

Exhibition of a Patient with Bilateral Syphilitic Ulceration of the Palpebral Conjunctiva, by Dr. C. A. Veasey.

Monocular Optic Neuritis. Two Specimens of Sarcoma of the Choroid, by Dr. S. D. Risley.

Improved Tests for Simulated Blindness, by Dr. Edward Jackson.

February 15, 1898.

Glioma of the Retina; Pseudo-glioma; Gummatous Keratitis; Sympathetic Irritation, by Dr. G. Oram Ring.

Extraction of Steel by Means of the Electric Magnet, by Dr. Edward Jackson.

A Case of Secondary Glaucoma Consequent upon Traumatic Forward Dislocation of the Lens, by Dr. E. K. Perrine (by invitation).

A Case of Keratoglobus, by Dr. G. C. Harlan.

A Case of Partial Recovery from Gangrene of the Skin of the Forehead and of the Lid of the Right Eye in a Child whose Brother and Sister had Suffered from the Same Affection, by Dr. B. A. Randall.

Recurring Ophthalmoplegia Interna, by Dr. H. F. Hansell.

A New Form of Bifocal Lenses, by Dr. G. C. Harlan.

March 15, 1898.

Exhibition of a Second Case of Keratoglobus, the Sister of the Case Shown February 15th, by Dr. G. C. Harlan.

A Case of Anomaly of the Iris, by Dr. Edward Jackson.

Three Cases of Hereditary Optic-nerve Atrophy, by Dr. W. C. Posey.

Methods of Precision in Locating Foreign Bodies in the Head by Means of the Röntgen Rays, with Especial Reference to Foreign Bodies in the Eye, by Dr. C. L. Leonard (by invitation).

The Localization of Foreign Bodies in the Eye by Means of the Röntgen Rays, by Dr. W. M. Sweet (by invitation).

A Case of Localization of a Fragment of Steel within the Eyeball and Unexpected Discovery of a Second Fragment by Means of the X-rays; Removal by the Electric Magnet, by Dr. H. F. Hansell.

April 15, 1898.

Three Cases of Micro-ophthalmos and Excessive Hyperopia with Macular Changes, Occurring in Sisters, by Dr. Wendell Reber (by invitation).

Two Cases of Foreign Bodies in the Vitreous, One Located by the X-rays and Extracted by the Magnet, by Dr. Louis F. Love (by invitation).

Direct Sunlight for Ophthalmoscopic Examination, by Dr. Edward Jackson.

Central Amblyopia Due to Chronic Lead-poisoning, with Cases, by Dr. G. E. de Schweinitz.

Central Amblyopia in a Dye-worker, Probably Produced by the Inhalation of the Aniline Dyes, by Dr. C. A. Veasey.

Useful Vision Restored by Iridectomy, by Dr. George Friebis.

Two Cases of Retained Nerve Sheath of the Hyaloid Artery, in One Extending from the Disk to the Lens, by Dr. Howard Mellor (by invitation).

October 18, 1898.

Two Cases of Extraction of Fragments of Steel from the Eye by Means of the Electro-magnet, by Dr. S. D. Risley.

Foreign Body in the Crystalline Lens Accompanied by the Formation of Cholesterin-crystals; A Wet Specimen Showing Cholesterin-crystals in the Anterior Chamber; Colored Drawings of Two Cases of Eyes Lost by Secondary Glaucoma, by Dr. C. A. Oliver.

Extraction of a Piece of Steel from the Choroid by Means of the Electric Magnet, by Dr. H. F. Hansell.

Partial Iridoplegia and Unusual Macular Changes after Iritis, by Dr. G. E. de Schweinitz.

A New Ophthalmoscope, by Dr. G. M. Gould.

November 15, 1898.

A Case of Traumatic Marginal Rupture and Paresis of the Iris and Multiple Torsion Streaks in the Choroid, without Rupture, by Dr. B. A. Randall.

The Value of Pilocarpine in the Treatment of Diseases of the Interior of the Eye, by Dr. R. R. Tybout (by invitation).

Toxic Chromotopsia and Toxic Hysteria, by Dr. G. E. de Schweinitz.

A Clinical Study of 287 Cases of Hyperphoria, by Dr. W. C. Posey.

December meeting omitted.

HOWARD F. HANSELL,
Clerk of Section.

LIST OF PAPERS: SECTION ON OTOLOGY AND LARYNGOLOGY.

A Case of Aural Vertigo, by Dr. George C. Stout.

Successful Operation on Mastoid Disease Attended with Intracranial Abscess, by Dr. B. Alexander Randall.

Hypertrophy of Lingual Tonsil with Paroxysmal Cough, by Dr. P. S. Donnellan.

Bilateral Abductor Paralysis of the Larynx Accompanying Tabes Dorsalis, by Dr. E. Larue Vansant.

Electric Head-lamp for Nose, Throat, and Ear Work, by Dr. E. B. Gleason.

Cases of Mastoid Disease, by Dr. B. Alexander Randall.

Report of a Case of Stacke's Operation, by Dr. E. B. Gleason.

Illustrations of Neurotic or Paradoxic Cough, by Dr. F. Woodbury.

Acute Empyema of Frontal Sinuses, by Dr. E. L. Vansant.

Polypus of the Nasal Septum, with Specimen, by Dr. J. S. Gibb.

Case of Laryngeal New-growth, Probably Malignant, by Dr. J. S. Gibb.

Demonstration of a Phantom Larynx, by Dr. P. S. Donnellan.

A New and Successful Treatment for Certain Forms of Headache, by Dr. E. L. Vansant.

Patient with Extreme Nasal Deformity, by Dr. P. S. Donnellan.

Case of Urticaria of the Larynx Causing Asphyxia in an Adult, by Dr. F. Woodbury.

The Antiseptic Reservoir Pipette, by Dr. Frank Woodbury.

Acute Otitis Media in Diphtheria with Klebs-Loeffler Bacillus in the Aural Discharge, by Dr. Charles H. Burnett.

Report of a Case of Necrosis at the Lower Portion of the Tympanum, by Dr. B. Alexander Randall.

A Case of Rhinolith, with Specimen, by Dr. B. Alexander Randall.

Report of a Case of Fracture of Frontal Sinus with Emphysema of Eyelid and Supraciliary Region, by Dr. E. L. Vansant.

A Case of Chorea of the Larynx, by Dr. P. S. Donnellan.

The Mechanical Principles Involved in Correction of Deviation of the Nasal Septum, by Dr. Edwin B. Gleason.

Result of an Operation for Bony Occlusion of Both Posterior Nares, with Presentation of Patient, by Dr. E. B. Gleason.

A Case of Tumor Mistaken for Cerebral Abscess Due to Middle-ear Disease, by Dr. C. W. Burr.

The Arrest of Nasal Hemorrhage, by Dr. Arthur W. Watson.

Exhibition of Specimens: A Large Rhinolith and an Unusual Foreign Body in the Auditory Canal, by Dr. J. S. Gibb.

Remarks on Orthoform as a Local Anæsthetic in Laryngeal Tuberculosis, by Dr. P. S. Donnellan.

An Extemporized Respirator, by Dr. A. B. Hirsh.

Report of a Case of Ear-vertigo Following Mumps Cured, after a Year's Duration, by Surgical Removal of the Incus, by Dr. Charles H. Burnett.

Remarks on Odorless Iodoform and Iodoformogen, by Dr. Frank Woodbury.

The proceedings of the Section on Otology and Laryngology have been reported and published regularly in the *Philadelphia Medical Journal.*

FRANK WOODBURY,
Clerk of Section.

LIST OF PAPERS: SECTION ON GENERAL SURGERY.

December, 1897.

A New Operation for Uraniscoplasty, by Dr. Randolph Faries.

A New Form of Apparatus for the Forcible Correction of Flat Foot, by Dr. H. Augustus Wilson.

A Case of Insertion of a Gold Plate for Saddle-nose without External Incision, by Dr. W. Joseph Hearn.

A Case of Cystic Tumor of the Ethmoid Cells, by Dr. John B. Roberts.

A Case of Hatchet-wound of the Brain, by Dr. John B. Roberts.

Four Cases of Stone in the Bladder, with Hypertrophy of the Prostate Gland, where Positive Diagnosis was Impossible until Double Castration, Resulting in Atrophy of the Prostate, Rendered the Passage of a Stone-searcher Possible, by Dr. Orville Horwitz.

January, 1898.

Congenital Absence of the Rectum, with Report of a Case, by Dr. Robert G. Le Conte.

Perfect Result after Double Tarsectomy for Pes Varus, by Dr. John B. Roberts.

February, 1898.

The Differential Diagnosis of Appendicitis, by Dr. Randolph Faries.

A Tumor of the Descending Colon, by Dr. D. T. Laine.

Six Amputations at the Hip-joint, with One Death; A Case of Aneurism of the Abdominal Aorta Treated by the Introduction of Wire and Galvanism; Two Cases Showing the Result after Removal of the Breast by a Modification of Halsted's Operation Similar to that Suggested by McBurney, by Dr. William H. Noble.

A Case of Necrosis of the Entire Top of a Baby's Skull from a Severe Burn, by Dr. W. W. Keen.

March, 1898.

The Mechanical Treatment of Dislocated Semilunar Cartilage at the Knee-joint, by Dr. Newton M. Shaffer (by invitation).

Discussion: Drs. Reginald H. Sayre, Wisner R. Townsend, Henry Ling Taylor, and Robert T. Taylor (by invitation); John Ashhurst, Jr., De Forest Willard, O. H. Allis, James K. Young, and H. Augustus Wilson.

April, 1898.

The Petroleum Ether Mixture of Schleich for General Anæsthesia, by Dr. M. L. Maduro (by invitation).

Personal Experiences with Schleich's New General Anæsthesia Mixture, by Dr. Randolph Faries.

The Simultaneous Administration of Ether and Oxygen for General Anæsthesia, by Dr. Thomas S. K. Morton.

A Demonstration of Inflatable and Removable Rubber Bulbs for all Forms of Intestinal Work, also a Continuous Knotted Suture for Intestinal Work, by Dr. A. J. Downes (by invitation).

May, 1898.

Castration and Vasectomy in Hypertrophy of the Prostate, by Dr. J. William White and Dr. Alfred C. Wood.

Curvature of the Neck of the Femur, sometimes called Coxa Vera, by Dr. Charles H. Frazier.

Exostosis Bursata, by Drs. Thomas S. K. Morton and Max J. Stern (by invitation).

November, 1898.

A Case of "Quiet Necrosis" of the Femur, with Specimens, by Dr. Alfred C. Wood.

A Skiagraph of a Case of Congenital Dislocation of the Shoulder, by Dr. John B. Roberts.

A Case of Excision of the Shoulder for Old Dislocation, with Skiagraph, by Dr. Thomas S. K. Morton.

A Case of Astragalectomy in an Adult, with Exhibition of the Patient, by Dr. James K. Young.

ALFRED C. WOOD,
Clerk of Section.

LIST OF PAPERS: SECTION ON GENERAL MEDICINE.

Ventricular Aneurism Secondary to Myocarditis, and Specimens from a Case, by Dr. Henry Morris.

Two Cases of Death without Discoverable Cause, by Dr. M. Howard Fussell.

Delayed Resolution in Pneumonia, and its Treatment, by Dr. Alfred Stengel.

A Case of Hysterical Hemiplegia, and one of Hysterical Tremor, by Dr. W. G. Spiller.

A Patient with Strictures of the Œsophagus following Typhoid Fever, by Dr. F. A. Packard.

A Case of Syphiloma of the Liver ; Complete Disappearance under the Use of Iodide of Potassium, by Dr. D. J. M. Miller.

A Case of Seborrhœa Nigricans, by Dr. John K. Mitchell.

A Case of Typhoid Fever, with Relapse ; Serum Reaction Absent in the Primary Attack, by Dr. A. A. Eshner.

A Case of Probable Miliary Tuberculosis, by Dr. A. A. Eshner.

Some Facts in Regard to the Frequency of Exophthalmic Goitre, by Dr. H. A. Hare.

A Case of Typhoid Fever, with Secondary Infection and Temporary Disappearance of the Widal Reaction, by Dr. Joseph Sailer.

Renal Calculus, by Dr. John H. Musser.

Typhoid Fever Complicated with Hysteric Manifestations and Hyperpyrexia, by Dr. J. M. Anders.

A Case of Aneurism of the Arch of the Aorta, by Dr. S. McC. Hamill.

A Case of Dilatation of the Aorta, by Dr. James Tyson.

Two Cases and a Specimen of Aneurism of the Thoracic Aorta, by Dr. F. A. Packard.

A Series of Specimens of Aneurism from Various Locations, by Dr. A. O. J. Kelly.

Two Cases of Progressive Muscular Dystrophy with Torticollis, One being of the Infantile Type, by Dr. W. G. Spiller.

A Case of Sarcoma of the Kidney, by Dr. C. W. Burr.

An Interesting Heart Case, by Dr. J. M. Taylor.

A Specimen of Aortic Valvular Disease, with Special Reference to Certain Physical Signs, by Dr. Alfred Stengel.

Decubitus in Enteric Fever, by Dr. James C. Wilson.

Some Cases of Early Crisis in Croupous Pneumonia; and a Case of Apyretic Typhoid Fever, by Dr. H. A. Hare.

A Case of Multiple Papillomata of the Colon, by Dr. Alfred Stengel.

Aneurism of the Arch of the Aorta, by Dr. J. C. Wilson.

A Case of Nasal Diphtheria Complicated by Broncho-pneumonia, by Dr. S. McC. Hamill.

A Case of Intrathoracic Growth Secondary to Carcinoma of the Breast, with Destruction of the Left Phrenic Nerve, by Dr. F. A. Packard.

A Case of Pyloroplasty, by Dr. M. H. Fussell.

Some Preventives, by Dr. Abraham Jacobi, of New York.

A Case of Banti's Disease, by Drs. Henry Morris and Joseph Sailer.

Local Flushing (Vasomotor Paresis) with Report of a Case in Neurasthenia, by Dr. F. Savary Pearce.

The Medical Treatment of Appendicitis, by Dr. Herman B. Allyn.

The Use of Myrtol in Affections of the Respiratory Tract, by Dr. S. Solis-Cohen.

A Case of Erythromelalgia, with Microscopic Examination of an Amputated Toe, by Drs. S. Weir Mitchell and W. G. Spiller.

A Case of Dissecting Aneurism of the Thoracic Aorta Rupturing into the Pericardial Sac, and Causing Death, by Dr. Judson Daland.

The Result of the Examination of the Blood of 100 Patients for the Widal Reaction, by Drs. Sailer, Campbell, and Grissinger.

A Rare Cardiac Complication in Influenza, by Dr. Samuel W. Morton.

Recurring Gastro-intestinal Hemorrhages in Chronic Enlargement of the Spleen, by Dr. William Osler.

A Case of Rhus Poisoning Contracted in an Unusual Manner, by Dr. J. A. Scott.

SAMUEL McC. HAMILL,
Clerk of Section.

LIST OF PAPERS: SECTION ON GYNECOLOGY.

January 20, 1898.

Two Successful Cæsarean Sections, by Dr. G. M. Boyd.

Double Cœliotomy for Appendicitis and Retroversion of the Uterus; Intestinal Paresis; Recovery, by Dr. John B. Shober.

A Case of Congenital Malformation of the Genitalia, and Remarks on a Specimen of Fibroid Tumor, by Dr. J. M. Baldy.

February 17, 1898.

Repeated Extrauterine Pregnancy, by Dr. W. A. N. Dorland.

The History of Pain and the Menstrual History of Extrauterine Pregnancy, by Dr. B. C. Hirst.

Two Cæsarean Sections, by Dr. B. C. Hirst.

Eclampsia, Ante-partum and Post-partum, by Dr. Edward P. Davis.

March 17, 1898.

(1) Extrauterine Pregnancy; (2) Interstitial Fibroma; Hysterectomy; Recovery; (3) Intraligamentary Fibroma; Hysterectomy; Recovery, by Dr. George Erety Shoemaker.

Upon the Cleansing of Operating-rooms, with the Exhibition of a Formaldehyde Disinfector, by Dr. Edward P. Davis.

April 21, 1898.

The Cæsarean *versus* Fœtal Mortality, by Dr. Edward Reynolds, of Boston (guest).

April 29, 1898.

Malignant Growths of the Chorionic Epithelium, by Dr. Harvey R. Gaylord (guest).

May 19, 1898.

The Use of Mammary Gland in the Treatment of Uterine Fibroids, and of Parotid Gland for Ovarian Disease, by Dr. John B. Shober.

Pulmonary Embolism Following Hysterectomy, by Dr. Judson Daland.

Two Cases of Fibroma of the Broad Ligament, by Dr. John C. Da Costa.

A Case of Primary Adenocarcinoma of the Fundus Uteri, by Dr. H. L. Williams (guest).

A Case of Recurrent Vulvar Growth, by Dr. J. M. Baldy and Dr. Wm. H. Wells.

A Contribution to our Knowledge of Chronic Inflammatory Hyperplasias of the Vulva, by Dr. H. D. Beyea.

October 20, 1898.

Ovarian Cyst Protruding through the Inguinal Canal, by Dr. J. M. Baldy.

Abdominal Section Three Months after Vaginal Section, by Dr. J. M. Baldy.

Peritonitis—Cause: Twisted Ovarian Tumor Pedicle, by Dr. John B. Deaver.

Ectopic Gestation Associated with Primary Tuberculosis of the Fallopian Tube, by Dr. John B. Shober.

November 17, 1898.

The Suture of the Wound After Abdominal Section, by Dr. John B. Deaver.

Two Cases of Sacro-iliac Disease in Parturient Women, by Dr. Edward P. Davis.

December 15, 1898.

The Report of Three Operations upon Diabetic Patients, by Dr. Charles P. Noble.

Remarks upon the Use of Mammary Gland and Parotid Gland Extracts in Gynecology, by Dr. John B. Shober.

Sarcoma of the Ovary, by Dr. G. M. Boyd.

JOHN B. SHOBER,
Clerk of Section.

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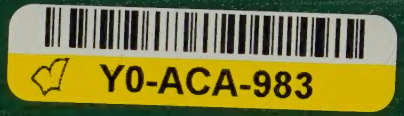
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